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Intent to engage in therapeutic lifestyle changes: Impact of an intervention, self-efficacy expectations, outcome expectations, and locus of control

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Intent to engage in therapeutic lifestyle changes: Impact of an intervention, self-efficacy expectations, outcome expectations, and locus of control

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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

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ABSTRACT

Engagement in Therapeutic Lifestyle Changes (TLCs), such as time in nature, physical activity, nutrition, sleep, social interaction, religion/spirituality, stress management, and helping others, provides many mental health benefits (Walsh, 2011). Young adults could particularly benefit from the use of TLCs, as they are at greater risk of experiencing mental health concerns (APA, 2013). I devised an intervention to enhance TLC engagement in college students, and examined the impact this intervention (against a control intervention), had on self-efficacy expectations, outcome expectations, mental health locus of control, intent to increase TLC use, and TLC use at one-week follow-up. Participants were 459 undergraduates. Participants completed baseline TLC use and self-efficacy expectations measures, then were randomly assigned to either a Control or my TLC intervention. Participants then responded to items assessing: post-intervention self-efficacy expectations, outcome expectations, mental health locus of control, intent to increase TLC use, and TLC preferences. Additionally, 211 of these participants completed a one-week follow-up survey inquiring about increased TLC use. Results demonstrated significant changes in pre- to post-intervention self-efficacy expectations for participants in the TLC condition; however, that condition did not bring a significant change in TLC use at follow-up. Outcome expectations partially mediated the direct relation between post-intervention self-efficacy expectations and intent to increase TLC use. Mental health locus of control did not moderate either intent to, or follow-up change in, TLC use post-intervention, as hypothesized. Regression analyses demonstrated that self-efficacy and outcome expectations accounted for 43% of the variance in intent to increase TLC use, and self-efficacy expectations accounted for 11% of the variance in post-intervention TLC use at one-week follow-up. I offer discussion on the implications of my findings and directions for future research.

CHAPTER 1. INTRODUCTION

The college years are considered to be a time of challenging classes, burgeoning independence, and identity formation. While these are all important experiences, they also have the possibility to bring along with them significant distress and mental health concerns (American College Health Association, 2004; 2006; Association for University and College Counseling Center Directors (AUCCCD), 2017; Benton, Robertson, Tseng, Newton, & Benton, 2003; Gallagher, 2006; Henriques, 2014; Kadison & DiGeronimo, 2004; Kashani, Canfield, Borduin, Soltys, & Reid, 1994). According to the American Psychological Association (APA, 2013), college students are a population that are significantly at risk for developing mental health concerns. Prevalence rates for mental health disorders demonstrate that the young adult years are a common time for the first manifestation of mood disorders, anxiety disorders, substance use disorders, and psychotic disorders. Mental health encompasses far more than specific mental disorders, however, and can also be assessed via an individual's well-being, life satisfaction, vitality, and emotion (Centers for Disease Control and Prevention, 2011; Keyes, 1998; Ryff, 1989; Ryff & Keyes, 1995; U.S. Department of Health and Human Services, n.d.; World Health Organization, 2001).

In my study, I focused upon these latter mental health components as they too can be negatively impacted during the young adult years. As mental health is both an important outcome variable and an imperative predictor variable influencing how students will perform academically (AUCCCD, 2017; Eisenberg, Golberstein, & Hunt, 2009; Luca, Franklin, Yueqi, Johnson, & Brownson, 2016; National Alliance on Mental Illness, 2012; Oswalt & Wyatt, 2011; Sontag-Padilla, et al., 2016), among other things, it is necessary to identify lifestyle

characteristics that foster positive mental health and prevent development of mental health concerns.

Therapeutic Lifestyle Changes

Certain lifestyle behaviors can help prevent the deterioration of mental health, buffer against challenging life events, and proactively foster positive mental health. I examined a set of eight such "therapeutic lifestyle changes" (TLCs) in my study, a phrase frequently found in both the physical and mental health literature, including: time with nature, sleep, physical activity, diet and nutrition, social interaction, service to others, stress management and relaxation, and spirituality and religion. These TLCs are said to have "potent" impacts on mental health and are considered to be as effective as psychotherapy and psychopharmacology in treating mental health concerns (see Walsh, 2011 for a review).

Spending time with nature has been associated with psychological, emotional, and, social well-being; recovery from stress and trauma; positive emotions; subjective vitality; meaningfulness; flourishing; and, a sense of purpose (Cervinka, Roderer, & Hefler, 2012; Health Council of the Netherlands, 2004; Howell, Dopko, Passmore, & Buro, 2011; Wolsko & Lindberg, 2013). Sleep has been linked with quality of life, well-being, and life satisfaction (Lund, Reider, Whiting, & Prichard, 2009); additionally, insufficient sleep is linked with decreased quality of mental health and multiple mental disorders (Blank et al., 2015; Brown, Carney, Parrish, & Klem, 2013). Physical activity has demonstrated correlations with resilience, well-being, subjective vitality, self-esteem, and quality of life (Knapen, Vancampfort, Morien, & Marchal, 2015; Ross & Hayes, 1988; Salmon, 2001). Proper diet and nutrition has been connected with happiness, life satisfaction, and well-being (Blanchflower, Oswald, & Stewart-Brown, 2013). Social interaction has been shown to be related to resilience, happiness, well-

being, and life satisfaction (Diener & Seligman, 2002; Ozbay et al., 2007). Being of service to others has shown links to experiencing a "helper's high," joy, love, self-acceptance, and personal growth (Borgonovi, 2008; Otake, Shimai, Tanaka-Matsumi, Otsui, & Frederickson, 2006; Post, Underwood, Schloss, & Hulbert, 2002; Schwartz, Keyl, Marcum, & Bode, 2009; Walsh, 1999). Stress management and relaxation has associations with stress reduction, quality of life, positive affect, life satisfaction, and mood (Impett, Daubenmier, & Hirschman, 2006; Lipe et al., 2012). Finally, spirituality and religion have shown correlations with psychological and relational well-being, and improved interpersonal interactions (Greenfield, Vaillant, & Marks, 2009; Koenig, McCullough, & Larson, 2001; Murray & Ciarrochi, 2007). There are a plethora of other positive effects and protective benefits of engaging in TLCs, and when adopted in combination, TLCs can confer even greater benefits.

Beyond the many mental health benefits they bestow, TLCs are relatively easy to engage in, fairly accessible to most people, typically cost-effective, lack the stigmatization associated with other forms of help-seeking (e.g., counseling and psychopharmacologic medications), and rarely have negative side effects. Barriers that prevent engagement in TLCs are mainly in the realm of low motivation, limited time and energy, attitude, and lack of awareness, rather than individuals' inability to access or perform them.

Social Cognitive Theory

Much of the research within the TLC literature has been conducted without a strong theoretical basis. To remedy this, I have chosen Bandura's Social Cognitive Theory (1986), formerly termed Social Learning Theory, to frame my study and to better understand the role that this theory can play in explaining how and why individuals choose to engage in or not engage in specific mental health-promoting behaviors. The overarching premise of Social Cognitive

Theory is that people engage in behaviors (beneficial or destructive) which lead to certain outcomes (positive or negative), learn from those experiences, which, in turn, influences their future engagement in these particular behaviors. Specifically, this link between people and their behavioral engagement is impacted by self-efficacy expectations for engaging in that particular behavior, and the link between behavior and outcome is impacted by outcome expectations (Bandura, 1977).

Self-efficacy expectations and outcome expectations are two very significant components of Bandura's Social Cognitive Theory and my current study. Self-efficacy expectations are defined as "peoples' beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (Bandura, 1994, pg. 71). Self-efficacy is known to be a powerful influence, as it determines peoples' feelings, thoughts, actions, and motivation. Outcome expectations are also a very influential determinant of peoples' actions, and are defined as a "person's belief that a given behavior will or will not lead to a given outcome" (Bandura, 1977; Maddux, Sherer, & Rogers, 1982, p. 209). Without sufficient levels of self-efficacy and outcome expectations, people will not take the risk of engaging in new behaviors or put forth the effort to change their current lifestyle behaviors.

In my study, I explored the impact of a TLC-promoting intervention that taught college students about the benefits of TLC utilization, and assessed how this intervention influenced participant self-efficacy expectations for engaging in TLCs. Then, I examined the link between participants' new knowledge of TLCs, participants' expressed intent to increase their use of TLCs, as well as their actual follow-up engagement in TLCs. I also sought to identify how self-efficacy expectations, outcome expectations, and locus of control influenced this relationship between learning and behavior.

Locus of Control

Whether someone identifies more significantly with an internal versus an external locus of control over their mental health, will significantly impact that person's intentions to engage in mental health-promoting behaviors (such as TLCs) and their actual use of them (Holden & Rotter, 1962; James & Rotter, 1958; Phares, 1957, 1962; Rotter, Liverant, & Crowne, 1961). Individuals who endorse an internal mental health locus of control will be more likely to believe that they (their own behavior and personal characteristics) determine the status of their mental health, whether or not they utilize TLCs to promote mental health, and the extent of the impact of that TLC use on their mental health (Rotter, 1966). Individuals who endorse an external locus of control will believe that their mental health status, engagement in TLCs, and outcome of that engagement, is outside of their personal control and up to chance, luck, fate, or powerful others (Rotter, 1966).

Locus of control is an important variable to consider within my study, because if someone believes they cannot influence their mental health, they will not be as willing to make lifestyle changes to attempt to change that which they believe they cannot. Therefore, the role that participants' perceptions of control play on likelihood of engaging in TLCs, and how other variables may influence that role, are important to determine. Past research has indicated that having a general internal locus of control is positively correlated with mental health, well-being, fewer depression symptoms, and engagement in lifestyle changes and behaviors (Gore & Rotter, 1963; Presson & Benassi, 1996; Shojaee & French, 2014; Tsai, Lee, & Tsai, 2015), therefore, it is also important to find ways to enhance individuals' sense of internal mental health locus of control.

Present Study

In my study, I designed and obtained information on the influence of a self-efficacy based TLC intervention, as well as the impact of participant self-efficacy expectations on engaging in eight specific TLCs, participants' mental health outcome expectations for engaging in those TLCs, participants' mental health locus of control, participants' intent to increase their use of TLCs, and participants' actual follow-up change in TLC utilization. My study added to the current literature by providing information about the types of mental illness prevention interventions that may successfully boost self-efficacy expectations to adopt TLCs and actual engagement in TLCs, providing an understanding of the multiple factors that can influence TLC use in a college population, and did so utilizing an empirically supported theoretical framework.

The importance of my study is multi-fold. First, identifying the specific variables that most impact intention to use TLCs will allow for the improved development of interventions that will enhance use of TLCs in college students. This is important as greater use of TLCs by more of the population can enhance global mental health and well-being, as well as prevent the onset of more serious mental disorders. Second, identifying the effectiveness of an online TLC intervention will help to demonstrate the utility of an easily distributed and accessed intervention method that can efficiently enhance TLC use. Finally, my study spread awareness of the benefits of TLCs to those students who participated.

CHAPTER 2. LITERATURE REVIEW

Just as "we are what we eat," our lifestyles significantly impact who we are mentally, emotionally, socially, and physically. Physical health promotion has been widely studied across the world for decades, by both independent researchers and governments alike, demonstrating the importance of health and health promotion. For this dissertation project, I focused on mental health, mental health promotion, and how lifestyle influences mental health. Specifically, I examined whether exposing participants to information about how particular therapeutic lifestyle behaviors can positively influence their mental health increased their willingness to adopt or enhance their engagement in these behaviors. I also examined the impact of self-efficacy expectations, outcome expectations, locus of control, and preference on individuals' willingness and ability to adopt or enhance their engagement in therapeutic lifestyle behaviors.

Therapeutic Lifestyle Changes

Walsh (2011) classified therapeutic lifestyle changes (TLCs) as potent factors that influence mental health, well-being, and cognitive functioning. Many different TLCs have been proposed in the literature, though at the core they are similar and tap into the same fundamental concepts. For the purposes of my study, I focused on the following TLCs, as listed by Walsh (2011): time with nature, sleep, physical activity (exercise), diet and nutrition, social interaction, being of service to others, stress management and relaxation, and spirituality and religion. One TLC from Walsh's review that I chose not to incorporate was recreation, examining sleep instead. My choice to exclude recreation was because of the possible confounding relationship between recreation, physical activity, and social interaction, whereas sleep has proven to be an important lifestyle factor (Dahl & Lewin, 2002; Do, Shin, Bautista, & Foo, 2013; McKnight-Eily et al., 2011; O'Brien & Mindell, 2005; Roberts & Duong, 2014).

People are not always aware of the importance of these lifestyle factors, and even if they are aware, they are not always good at incorporating them into their daily lives despite the numerous benefits they can confer (Walsh, 2011). Not only can TLCs help prevent negative mental health problems from arising, they can also ameliorate effects of mental health difficulties once they have already begun and allow for individuals to take more control over their mental health. TLCs (such as physical activity) have been found to be as effective in treating mental health concerns (such as depression) as psychotherapy or pharmacotherapy (Amminger et al., 2010; Dowd, Vickers, & Krahn, 2004; Knapen et al., 2015; Sidhu, Vandana, & Balon, 2009; Walsh, 2011). Walsh (2011) reviewed the benefits of utilizing the TLCs as both a preventative and reactive measure for mental health, including: cost-effectiveness, accessibility, low stigma, and few side effects. For example, we know that medication and psychotherapy are beneficial treatments for depression and other mental health concerns; however, so too is the utilization of lifestyle factors such as physical activity, diet and nutrition, sleep, social interaction, and relaxation and stress management (Berk, 2009; Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005; Garcia-Toro et al., 2012; Harvey, Hotopf, Overland, & Mykletun, 2010; Hidaka, 2012; Sanchez-Villegas et al., 2009; Sarris, O'Neil, Coulson, Schweitzer, & Berk, 2014; Soria & Urretavizcaya, 2009; Wirz-Justice et al., 2005).

As TLCs are beneficial, and there is evidence supporting their effectiveness, assessing the willingness of individuals to engage in them is an important issue to examine as TLCs are often underestimated and underutilized (Angell, 2009). Subsequently, I review each of the eight TLCs that I incorporated into this study, exploring the literature on the mechanisms of impact of each TLC, the benefits of each TLC, and ways in which TLCs interact with one another.

Spending Time with Nature

Current generations are experiencing what Louv (2005) has termed a "nature-deficit disorder," in which people are no longer connected to, and do not interact with, nature. This is unfortunate, as engaging with nature has been shown to offer many positive mental health benefits, such as mental restoration and enhanced mood (Berman, Jonides, & Kaplan, 2008), and losing this connection with nature which past generations experienced more consistently is detrimental to the people of today. To spend time with nature one must be able to experience the greenery, natural light, or other natural elements (flora, fauna, sky, sun, etc.) that nature can provide. Spending time with nature encompasses a wide range of activities, including: sitting in nature, engaging in physical activities outdoors (e.g., walking, jogging), working in nature (e.g., gardening, landscaping), viewing nature through a window, and viewing pictures of nature (Berman et al., 2008; Dzhambov, 2014; Felsten, 2009; Grandner, Kripke, & Langer, 2006; Hartig, Evans, Jamner, Davis, & Garling, 2003; Korpela & Kinnunen, 2011; Kuo, 2015; Ryan et al., 2010).

Mechanisms of impact. There are several theories as to why and how exposure to nature is beneficial. One set of hypotheses identified up to 21 plausible causal pathways linking nature and health, all of which have empirical support and have been correlated with specific health outcomes (e.g., depression, anxiety; Kuo, 2015). The four main pathways included: air quality, physical activity, stress, and social integration. Other pathways included: environmental factors (e.g., sights of nature, air pollution), physiological and psychological states (e.g., relaxation, vitality), and behaviors and conditions (e.g., physical activity, social ties).

A second explanation, highlighting the connection between physical activity in nature and psychological health and well-being, is the *Ecological Dynamics* perspective as explored by

Brymer, Davids, and Mallabon (2014). The *Ecological Dynamics* perspective suggests that the individual-environment relationship is the main unit of functioning and determines human development. Similarly, *Ecopsychological Theory* identifies the interdependence between humans and nature, the environment, and the universe (Wolsko & Lindberg, 2013). These two theories highlight just how integral nature is to humans.

Attention Restoration Theory (ART; Kaplan, 1995) provides another way to understand how spending time with nature is beneficial. According to ART, attention is drained through use, but it can be restored under certain conditions and in certain types of settings. When attention is drained, fatigue sets in and may decrease performance on tasks and activities (Felsten, 2009; Kaplan, 1995). Nature has many properties that are needed for attentional restoration to occur. When people spend time with nature, directed attention has a chance to be restored as involuntary (non-directed) attention is targeted by fascinating stimuli in nature (Kaplan, 1995). Both viewing pictures of nature and actual interactions with nature have demonstrated these restorative benefits (Felsten, 2009). For example, viewing pictures that included nature offered more restoration to college students than did viewing pictures without nature, F (12, 223) = 77.78, $p < 001$.

Last, sunlight exposure also explains the positive impact of spending time in nature on mental health. More light exposure has been significantly, although weakly, positively correlated to quality of life (r = .19), social functioning (r = .16), and emotional well-being (r = .13; Grandner et al., 2006). Light exposure is a therapeutic tool that has demonstrated effectiveness in treating both seasonal and non-seasonal depression, low-level anxiety, OCD, bulimia, sleep disorder, jet lag, and dementia; and, it has proven effective in improving mood in non-clinical

populations (Paino, Fonseca-Pedrero, Bousono, & Lemos-Giraldez, 2009; Terman et al., 1989; Youngstedt & Kripke, 2007).

Benefits. Mental health and nature are linked, and the more time individuals spend with nature the greater the positive impact on their health outcomes (Kuo, 2015). Studies (Cervinka et al., 2012; Howell et al., 2011; Wolsko & Lindberg, 2013) have demonstrated low magnitude associations between connectedness to nature (emotional connection to nature, sense of oneness with nature) and psychological well-being (r = .15 to .30), emotional well-being (r = .17), social well-being (r = .20 to .23), recovery from stress and/or traumatic experiences, positive emotions (r = .26), negative emotions (r = -.31), subjective vitality (r = .23 to .37; having physical and mental energy), meaningfulness (r = .21 to .23), flourishing (r = .32), mindful awareness (r = .15), and a sense of purpose. Additionally, depression, anxiety, ADHD, and migraines (often stress-induced) are mental health concerns that research has shown can be reduced through spending time with nature (Kuo, 2015). Dzhambov (2014) grouped the types of benefits people experience when they interact with nature into three categories of well-being: social (e.g., harmony when communicating, understanding other people), psycho-emotional (e.g., relaxation, well-being – feeling happy, reduced anxiety), and physiological.

Evidence suggests that for college students positive emotions increase in nature environments and decrease in urban environments, and that anger and aggressiveness decrease in nature environments and increase in urban environments (Hartig et al., 2003). Evidence has also demonstrated that exposure to nature is positively related to vitality (r = .30), and that viewing "outdoor" pictures increases vitality whereas viewing "indoor" pictures decreases vitality (Ryan et al., 2010). Ryan and colleagues also found that the presence of natural elements (versus artificial elements) mediated the relation between being outdoors and experiences of vitality.

Days in which participants spent at least 20 minutes outside demonstrated greater experiences of vitality (r = .17) compared to participants who did not.

Westlund (2015) conducted a qualitative study in which she interviewed four veterans recovering from stress and post-traumatic stress. The veterans cited nature as being crucial to their ability to recover and re-enter their worlds. They reported interacting with nature helped them to cope with their trauma symptoms, be more present with the world, feel fulfilled, regain a sense of control, experience a sense of safety, develop a renewed sense of purpose, and reconnect with their bodies and with other people. In essence, connecting with nature allowed for "regaining one's lost sense of humanity."

Conversely, a lack of connection with nature and not spending sufficient time with nature can lead to detrimental effects. For example, Kuo (2015) asserted that less greenness in individuals' environments has been correlated with higher risk of morbidity and mortality. Louv (2005) asserted that experiencing "nature-deficit disorder" can lead to attention difficulties and increased rates of both physical and emotional illnesses.

Interactions with other TLCs. Spending time with nature also interacts with other TLCs, such as physical activity, to provide compounded benefits. For instance, repeated physical activity in nature has been linked with enhanced long-term emotional well-being (B = .21, R^2 = 4.1, p <.001); and physical activity in nature has been shown to enhance the positive impact of physical activity alone (Pasanen, Tyrvainen, & Korpela, 2014). Overall, physical activity in nature accounted for 26% of the variance in emotional well-being. Also, Berman and colleagues (2008) found that mood has been seen to improve for college students who walk in nature settings versus urban settings (F (1, 35) = 9.64, p_{rep} = .98).

Ryan and colleagues (2010) examined the connections between spending time outdoors, social interaction, and physical activity. They conducted multiple studies with college students examining the effects of these three TLCs on self-reported subjective vitality. Results from these studies demonstrated that being outdoors (r = .12), social interaction (r = .24), and physical activity (r = .08) all had small positive correlations with subjective vitality; and, being outdoors had a separate effect (controlling for social interaction and physical activity) b = 1.84, t (110) = 2.31, $p < .05$, on vitality. Nature, however, fully mediated the effect of being outdoors on subjective vitality, suggesting that it is not the physical act of being outside that provides benefit but rather the presence of natural elements.

Sleep

Insufficient sleep, defined as not receiving the amount and quality of sleep that is recommended by the National Sleep Foundation (teenagers need 8-10 hours of sleep and young adults need 7-9 hours of sleep; Hirschkowitz et al., 2015) for optimal physical and mental functioning, has come to be regarded as a significant public health problem. A recent analysis determined that college students were getting a median of 6.65 hours of sleep per night, one hour of sleep per night less than college students were getting in 1969 (Hicks, Fernandez, & Pellegrini, 2001). In another study, a majority of college students (60%) reported poor quality of sleep in addition to too little sleep (Lund et al., 2010).

Not getting sufficient sleep has been shown to lead to physical, emotional, and cognitive functioning concerns (Daly et al., 2015). Lack of adequate sleep is an exacerbating factor associated with greater prevalence of mood disorders, mood instability, anxiety disorders, behavior disorders, psychological distress, substance use problems, suicidality, poorer well-being, decreased life satisfaction, interpersonal impairments, and reduced quality of life (Blank

et al., 2015; Bowen, Balbuena, Baetz, & Schwartz, 2013; Daly et al., 2015; Garcia-Toro et al., 2012; Lund et al., 2010; Roberts & Duong, 2014; Walther , Aldrian, Stuger, Kiefer, & Ekmekcioglu, 2014). Conversely, receiving sufficient sleep can help buffer against these mental health concerns.

Mechanisms of impact. Sleep provides the body with the opportunity to restore functioning, allow for physical growth, solidify information in memory processes, and heal bodily injuries. The Diagnostic and Statistical Manual 5 (DSM; APA, 2013) identifies several mental disorders with symptoms or criteria that include either too much or too little sleep, in particular, depression. Depression and insufficient sleep tend to demonstrate a reciprocal association, such that depression can lead to sleep difficulties (hypersomnia or insomnia) and sleep difficulties can lead to greater mood problems (Roberts & Duong, 2014). Jackson, Sztendur, Diamond, Byles, & Bruck (2014) also found that insomnia both co-occurs with and precedes depressive episodes.

Benefits. Amount and quality of sleep (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime functioning) have been identified as influential predictors of life satisfaction, well-being, quality of life, and general functioning for college students (Garcia-Toro et al., 2012; Lund et al, 2010; Walther et al., 2014). Sleep deprivation and poor sleep quality have been connected to greater likelihood to experience negative moods ($F > 25$, $p < .001$), stress ($F = 72.4$, $p < .001$), and decreased life satisfaction compared to individuals receiving optimal sleep (Lund et al., 2010).

Both too little and too much sleep can be debilitating and can lead to depression, anxiety, and suicidality. For example, short sleep duration (less than six hours per night) in a non-clinical population demonstrated significant associations with greater endorsement of experiencing

sadness (OR = 1.98), suicidal behavior (suicidal thoughts OR = 2.04, suicide plan OR = 2.38, and suicide attempt OR = 2.09), and substance use (alcohol use OR = 1.84, tobacco use OR = 2.15, marijuana use OR = 1.81; Daly et al., 2015). A review conducted by Winsper and Tang (2014), across five prospective studies with non-clinical samples of adolescents and young adults, found that a significant link between sleep problems and suicidality was present when controlling for depression (HR = 2.1-3.84, OR = 1.20-2.85). Jackson and colleagues (2014) sampled a group of non-clinical young women, and found that those who reported greater sleeping difficulties were more at risk for developing depression and anxiety in the future. Women who had identified frequent sleep difficulties when surveyed in 2000 were significantly more likely to have a diagnosis of depression (OR = 4.42) and a diagnosis of anxiety (OR = 2.90) when contacted in 2009, and the greater the sleep difficulties, the higher the prevalence of depression. For instance, 18.5% of women who reported often having sleep difficulties had a diagnosis of depression compared to the 3.6% of women diagnosed with depression who had rare sleep difficulties. Obtaining less sleep has also shown low correlations with greater mood instability ($b = .14$, $t = 2.07$, $p < .05$), which strongly influenced neuroticism, and which in turn, was an important predictor of psychological distress (Bowen et al., 2013). As this evidence suggests, insufficient sleep can be one factor leading to many detrimental mental health effects.

Insomnia and likelihood of being diagnosed with a mental disorder (particularly an anxiety disorder [OR = 3.28], behavior disorder [OR = 2.62], or mood disorder [OR = 5.44]) were positively correlated among adolescents, with more than 50% of adolescents with insomnia experiencing a co-occurring mental disorder. (Blank et al., 2015). In addition, the researchers found that adolescents with insomnia were at a significantly greater risk of suicidality, poorer perceived mental health, and tobacco use.

Interactions with other TLCs. Limited evidence has been found to support the connection between sleep and other TLCs, although several studies are worth noting. One study highlighted the helpfulness of using relaxation strategies (e.g., progressive muscle relaxation, deep breathing) to reduce sleep interference and enhance sleep quality (Kloss, Nash, Horsey, & Taylor, 2011; Morgenthaler et al., 2006; Morin et al., 2006), suggesting that TLCs not only positively impact mental health but also positively impact each other. Another study identified the compounded effects of incorporating a sleep intervention with other TLC interventions for individuals diagnosed with depression. Participants that adhered to specific sleep, physical activity, light exposure, and diet/nutrition recommendations were more likely than their counterparts to experience reduced depression symptoms, go into remission for their depression, and have less need for antidepressant medication (Garcia-Toro et al., 2012).

Physical Activity

Physical activity has been shown to foster positive mental health and well-being, and these effects can be both preventative and therapeutic in nature (Dale, Brassington, & King, 2014; Walsh, 2011). Engagement in physical activity has been connected to greater stress resilience, reduction of depression and anxiety symptoms, emotional well-being, ability to cope with stress, subjective vitality, well-being, self-esteem, and quality of life (Blumenthal et al., 2007; Dunn et al., 2005; Joseph, Royse, Benitez, & Pekmezi, 2014; Knapen et al., 2015; Molina-Garcia, Castillo, & Queralt, 2011; Ross & Hayes, 1988; Salmon, 2001; Van Kim & Nelson, 2013).

Physical activity is not solely defined as running, lifting weights, or using other gym equipment. Additional types of physical activity include: racquetball, tennis, bowling, jogging, biking, swimming, aerobics, playing sports, and walking (Ross & Hayes, 1988). The definition

of physical activity in this study was based on the definition used by the World Health Organization: “any bodily movement produced by skeletal muscles that requires energy expenditure.”

The cause-effect relationship of exercise on mental health is somewhat disputed in the literature. There is significant correlational research (observational research), and some causal research (randomized controlled trials), suggesting that physical activity is associated with more positive well-being, decreased risk of developing depression, and reduction of depression symptoms (Emerson & Williams, 2015). Multiple researchers, however, have identified that the fitness level of the individual and the intensity of the exercise in which they engage are not solely responsible for leading to less negative affect, increased positive affect, less tension, decreased dejection, decreased hostility, less confusion, and decreased stress (Aganoff & Boyle, 1994; Berger & Owen, 1983; Crocker & Grozelle, 1991; Long, 1983). One hypothesis was that rather than the actual element of physical activity, simple participation and involvement in an exercise treatment program may be the important factor that lead to stress reduction (Long, 1983). Therefore, past studies that have solely focused on the actual element of physical activity in isolation may not have found significant results.

Mechanisms of impact. There are multiple mechanisms through which physical activity has been proposed to have an impact on mental health. Sidhu et al. (2009) and Dowd et al. (2004), reviewed the pathways through which physical activity can impact mood, including: boosting endorphins, impacting neurotransmitter levels (e.g., serotonin and norepinephrine), improving self-esteem, improving general self-efficacy, reducing cortisol, and distracting from stress.

The type and frequency of exercise may play a significant role in how physical activity fosters positive mental health and buffers against mental health concerns. A dose-response relationship of aerobic activity on depressive symptoms has been identified, such that expending energy at a 17.5 k-cal/kg/week rate was found to be better for reducing depression symptoms or increasing likelihood for remission than was engaging in physical activity that expended less energy (Dunn et al., 2005). The number of days expending this energy, whether it was 3 days/week or 5 days/week did not have an impact (Dunn et al., 2005). Rohrer, Pierce, and Blackburn (2005), however, found that participants who engaged in physical activity between two and five or more days per week exhibited slightly greater mental health benefits than did individuals who engaged in zero or one day of physical activity per week. Rohrer and colleagues (2005) did not measure energy expenditure, so it is quite possible that a greater number of days of physical activity in this study amounted to better results, where it did not in the study conducted by Dunn and colleagues (2005). An important caveat noted in the literature, though, is that exercising at levels greater than is routine for an individual, exercising at competitive levels for habitual exercisers, and strenuous exercise in inappropriate situations (e.g., when injured, when not in proper physical condition), can actually worsen mood (Salmon, 2001).

Benefits. Engagement in physical activity has been found to lead to enhanced well-being and quality of life (Baydala, Hiebert, & Malec, 2000). A meta-analysis examining the impact of physical activity on quality of life found a significant effect (ES = .21) in a psychologically well population (Gillison, Skevington, Sato, Standage, & Evagelidou, 2009). Limited physical activity has shown connections with lower reported well-being; results also identified that the more physical activity engaged in, the greater the positive impact on well-being (r = .13; Ross &

Hayes, 1988; Walther et al., 2014). Van der Zwan, de Vente, Huizink, Bogels, and de Bruin (2015) found an effect of d = .46 of physical activity on psychological well-being.

In samples of undergraduate students, Joseph, et al. (2014), Molina-Garcia et al. (2011), Van Kim and Nelson (2013), found that students who engaged in more physical activity were less likely to report poor mental health, and more likely to report increased exercise self-efficacy (r = .26), increased levels of subjective vitality, and more positive affect (r = .17). Physical self-esteem, positive affect, and negative affect were found to be strong mediating variables of the relation between physical activity and quality of life (Joseph et al., 2014). Emerson and Williams (2015) found that engagement in physical activity led to immediate increases in positive emotion, but this effect varied by intensity level of the physical activity in which one engaged. Individuals experienced positive effects in low to moderate intensity exercise and more negative effects for high intensity exercise.

According to data collected from four meta-analyses and several other independent studies, physical exercise demonstrated benefits comparable to antidepressants and psychotherapy in people with mild to moderate depression and is considered to be a valuable addition to treatment for severe depression (Dunn et al., 2005; Knapen et al., 2015). Blumenthal and colleagues (2007) found similar results in that aerobic exercise and antidepressant medication were equal in remitting depressive symptoms, and both of these forms of treatment were more effective than a placebo treatment.

Physical activity has been found to be inversely correlated with onset of a mood or anxiety disorder and has been found to have positive effects during treatment for individuals already struggling with a mental illness (ten Have, de Graaf, & Monshouwer, 2011). Babyak and colleagues (2000) conducted a study in which adults diagnosed with major depressive disorder

were assigned to aerobic exercise therapy, antidepressant medication therapy, or a combination of the two. After four months of engagement in the prescribed therapy, participants in the three groups demonstrated similar rates of symptom remission. At six-month follow-up, participants in the exercise group demonstrated lower rates of relapse than did participants in the medication group (standardized OR = .49, $p < .001$). Van der Zwan and colleagues (2015) found in their study that physical activity had an effect ($d = -.80$) on depression, an effect ($d = -.74$) on anxiety, and an effect ($d = -.71$) on stress, demonstrating the positive impact physical activity had on mental health. Rohrer and colleagues (2005) discovered that engagement in physical activity was associated (adjusted OR = 1.70 – 5.37, $p < .001$) with an overall sense of self-reported mental health (stress, depression, and emotional concerns).

Interactions with other TLCs. Engagement in physical activity provides ample opportunity for social interactions, which has been shown to increase the likelihood that individuals will engage in physical activity (Grant, Hogg, & Crano, 2015). Healthy adults who identified with an exercise group have been shown to engage in more physical activity ($B = 210$, $t\ (126) = 2.51$, $p < .05$), a relationship mediated by physical activity self-efficacy and outcome expectations. The impact of social interaction has even demonstrated a mediating role between vigorous physical activity and mental health and stress benefits in college students (Van Kim & Nelson, 2013). Clearly, physical activity and social interaction are intricately linked. Physical activity also provides ample opportunity for interactions with nature. Ryan and colleagues demonstrated that subjective vitality was a benefit that can result from engaging in physical activity, particularly when this physical activity was conducted in nature.

Diet and Nutrition

Diet and nutrition refer to the nutrients that individuals consume (Dale et al., 2014; Garcia-Toro et al., 2012; O'Neil et al., 2014; Walther et al., 2014). With this TLC there is not a focus on eliminating any foods, but rather on balance and moderation of all of the food groups, with particular focus on certain important nutrients.

The literature is divided on the impact that diet and nutrition have on mental health. However, O'Neil and colleagues (2014) systematically reviewed and identified multiple studies that demonstrated consistent and significant relationships between unhealthy dietary patterns (lower consumption of healthy, nutrient-dense foods such as vegetables, fruits, and fish; and, higher consumption of unhealthy foods such as saturated fat, refined carbohydrates, and processed food products) and poorer mental health (occurrence of depression and anxiety symptoms). According to another systematic review conducted by Dale and colleagues (2014), adhering to a lifestyle intervention that focused on diet and nutrition led to more positive mental health, greater well-being, and better quality of life.

Mechanisms of impact. Nutrients and their metabolites from diet (e.g., amino acids) act on a neurochemical level and are essential to neural functioning (Walsh, 2011). Nutrients act on neurochemical transmission processes, one pathway through which beneficial effects can arise (Sarris, Schoendorfer, & Kavanagh, 2009; Williams et al., 2006). Nutrients can also have anti-inflammatory or regulating characteristics on inflammatory processes, which have been implicated as a contributor to or cause of depression (Hibbeln & Gow, 2014; Walsh, 2011). Food and nutrients have also been shown to influence mood, emotion, and cognitive ability through vagal nerve stimulation (VNS) and gut hormone production (e.g., serotonin; Gomez-Pinilla, 2008). VNS has proven to be an effective long-term treatment for depression, and digestive

hormones (e.g., leptin, insulin) impact synapse activity which signal the brain and effect mood (Gomez-Pinilla, 2008).

Benefits. Eating a well-balanced diet can lead to many mental health benefits. Adequate daily consumption of fruits and vegetables has been shown to have positive effects on general health (e.g., sleep, stress, happiness) outcomes (Blanchflower et al., 2013); adequate consumption of fish has been shown to have beneficial effects on mental well-being (Blanchflower et al., 2013); and healthy diets (higher consumption of nutrient-dense foods) have been positively associated with quality of life (Jacka et al., 2011). Crichton, Bryan, Hodgson, & Murphy (2013) conducted a study in which they found that consumption, or lack of consumption, of specific foods was associated with various mental health benefits. For example, plant food intake was positively associated with general health and greater vitality, and was inversely associated with depression, anxiety, and perceived stress.

Certain diet and nutrition patterns have proven to have important effects on depression, anxiety, and other mental disorders (Garcia-Toro et al., 2012; Harbottle & Schonfelder, 2008; Sarris et al., 2009). Multiple studies (Jacka et al., 2010; Sanchez-Villegas et al., 2009) have identified that adhering to a Mediterranean diet (predominant consumption of fruits, vegetables, nuts, legumes, olive oil, and fish) buffers against the development of depression (OR = .65) and anxiety (OR = .68). Additionally, Hibbeln and Gow (2014) reviewed the evidence concerning the consumption (or lack thereof) of omega-3 fatty acids and omega-6 fatty acids. A significant influence on depression risk was found; specifically, omega-3 fatty acids were found to be beneficial in remediating severe depression (ES = .57-.73; Appleton & McGowan, 2006; Appleton, Rogers, & Ness, 2010), while omega-6 acids were detrimental and risk-enhancing.

Conversely, unhealthy eating habits, such as more frequently consuming fast food, snacks, soft drinks, energy drinks, and alcohol, have been shown to diminish sense of well-being (Walther et al., 2014). Those who consumed these foods more frequently reported slightly lower well-being than those that consumed these foods less frequently. Specifically, 59% of participants who consumed these foods frequently reported lower well-being (41% reported higher well-being, $p < .01$), while 54% of participants who consumed these items one time per week or less reported higher well-being (46% reported lower well-being, $p < .01$). This dietary pattern is often referred to in the literature as the "Western diet." Oddy and colleagues (2009), who studied the impact of the Western diet on depression, found that individuals adhering to this diet were more at risk for experiencing depression ($b = 1.25\text{-}2.6$, $p < .05$) and behavioral problems ($b = 2.2$, $p < .001$) than individuals who did not adhere as strongly to this dietary pattern.

Interactions with other TLCs. Diet and nutrition have consistently been linked to other TLCs, such as social interaction and physical activity. For college students, support from peers, family, and friends, was found to significantly impact the relation between dietary self-efficacy and dietary intention to consume fruits and vegetables ($r = .28$), which in turn led to higher actual consumption of fruits and vegetables ($r = .29$; Fernandez, Warner, Knoll, Montenegro, & Schwarzer, 2015). Also, there is evidence demonstrating that interventions which simultaneously targeted physical activity as well as diet and nutrition were even stronger in their ability to enhance mental health and well-being versus solely focusing on physical activity (Dale et al., 2014).

Social Interaction

Social interaction has been defined as the frequency and quality of time spent in the company of others (e.g., family, friends, peers, acquaintances; Ishii-Kuntz, 1990; Nezlek, Richardson, Green, & Schatten-Jones, 2002). Social support (a sub-category of social interaction) has been defined as the "various forms of aid and assistance supplied by family members, friends, neighbors, and others" (Barrera, Sandler, & Ramsay, 1981). Both social interaction and social support can foster positive mental health. Engagement in social interaction has been shown to have a positive impact on psychological well-being across all stages of adulthood (Ishii-Kuntz, 1990). Social support has demonstrated that it is an important factor in maintaining good mental health, remaining resilient to stress, enhancing subjective well-being, increasing happiness, boosting self-esteem, and preventing sadness (Diener & Seligman, 2002; Ozbay et al., 2007; Thoits, 1995).

Mechanisms of impact. Social interaction and social support have demonstrated multiple avenues through which stress can be relieved and positive mental health can be fostered. Social support can provide help during times of distress, provide others with whom one can vent concerns, and stave off feelings of loneliness. There are also several physiological avenues through which social support affects mental health. One way is through the buffering impact that social support can have on the hypothalamic-pituitary-adrenocortical system, which when activated beyond an optimal range has been shown to increase stress and stress responses (Ozbay et al., 2007). Social support has also been found to provide benefits via increased production of oxytocin, a naturally occurring hormone that helps create a desire to connect with and care for others (Ozbay et al., 2007).

Benefits. There are multiple types of social support to consider when exploring the impact that both social support and social interaction have on mental health. Perceived social support, enacted social support (support received from others), family embeddedness, and provided support (support provided to others) are all types of social support that can be given or received, and they have been found to be positively linked to life satisfaction (r = .18) and positive affect (r = .14), although personality variables (e.g., emotional stability, extraversion, and conscientiousness) partially mediated this relation (Siedlecki, Salthouse, Oishi, & Jeswani, 2014). Nezlek and colleagues (2002) discovered that well-being and life satisfaction were positively related to enjoyable social interactions (r = .24 to .26), confidence during social interactions (r = .20), perceived control during social interactions (r = .22 to .24), and amount of social activity (r = .31 to .39), with being married and interactions with spouses accounting for significant relationships between well-being and quality of social interaction.

Greater social support in college students can also buffer against the development of mental health problems. Those with lower quality (e.g., less supportive, less accessible) social support were found to be six times more likely to develop depressive symptoms than students with higher quality social support (Hefner & Eisenberg, 2009). These researchers stated that college students who were more likely to be socially isolated and experience lower quality social support were: male; Asian, biracial, or an international student; did not live with a significant other; and, were experiencing financial struggles. Cohen, McGowan, Fooskas, and Rose (1984) found that perceived social support had a stress-buffering effect between negative life events and psychological distress, but received social support did not. This suggests that it is not necessarily the actual support that is important to deriving the benefits that social interaction/support can offer, but rather the perception of one's support that brings benefits. Additional evidence comes

from a meta-analysis conducted by Finch, Okun, Pool, and Ruehlman (1999), in which 52 effect sizes (across 44 studies) were analyzed. Finch and colleagues found that perceived support and psychological distress were statistically significantly negatively related, with a weighted mean effect size of -.30, whereas received support and psychological distress were negatively related with a weighted mean effect size of -15. Similarly, having more social media friends provided strong perceptions of social support (r = .14), stress reduction (r = -.10), and enhanced life satisfaction (r = .20; Nabi, Prestin, & So, 2013).

Interactions with other TLCs. Social interaction and physical activity have demonstrated important links with each other. For instance, seeking an exercise partner and exercising with that partner have been shown to be connected to received emotional social support, which predicted self-monitoring of exercise behavior (B = .3, p < .01) and exercise self-efficacy (B = .38, p < .01), which in turn predicted greater engagement in physical activity (B = .48, p < .01; Rackow, Scholz, & Hornung, 2015). In this model, exercise self-efficacy mediated the relation between received emotional social support and physical activity, indicating that self-efficacy plays an important role in TLC engagement.

Being of Service to Others and Altruistic Behavior

Evidence has demonstrated that serving others, volunteering, and altruism, are connected to mental health, happiness, and well-being (Borgonovi, 2008; Post, 2007; Schwartz, 2010). Self-initiated volunteering in particular led to better mental health (Musick & Waggoner, 2007), and volunteers reported a “helper’s high” after providing service to others (Post et al., 2002). Being of service to others refers to helping others (Gebauer, Riketta, Broemer, & Maio, 2008; Schwartz et al., 2009). Altruism is a related concept, but has a more specific definition. Altruism has been defined as: “other oriented concerns or compassion that is motivated by generativity (Erikson,

1968), by concern for the welfare of others (Dovidio, Pilaivin, Schroder, & Penner, 2006), and by need for meaningful human connectedness" (Kahana et al., 2011; Kahana, Bhatta, Lovegreen, Kahana, & Midlarsky, 2013, p. 161). Altruistic behavior has included family helping behaviors, having a helping orientation (propensity to help others), active and engaged listening, and lending emotional support (Schwartz, 2010; Schwartz et al., 2009).

Mechanisms of impact. There is a proposed model (Schwartz, 2010; Schwartz et al., 2009; Schwartz & Sendor, 1999) explaining how altruistic behavior can lead to improved quality of life and mental health. Focusing on helping others can allow helpers to disengage from their habit of self-reference and be more open to changes in their internal standards, values, and conceptualizations of quality of life. The model linking altruism and mental health is an extension of *response shift theory* (Rapkin & Schwartz, 2004). When a catalyst negatively challenges a person's quality of life (e.g., creates a negative change in mental or physical health), people have to adjust to the effect of that catalyst. One method of adjustment is engaging in altruistic practices, and helping others. This allows individuals to focus outward, disengage from their patterns of self-reference, and be more open to changing their own viewpoints. Being able to help others, even if one is in distress, enhances both sense of purpose and self-esteem (Schwartz, 2010). An additional possible explanation of the benefit of volunteering is that such activity can decrease helpers' concern with and focus on their own social status, can promote more social networking, and can provide opportunities for social interaction (Borgonovi, 2008).

Benefits. Happiness, good mental health, spiritual maturity, love, joy, subjective well-being, and generosity are some of the benefits that have been shown to evolve from being of service to others (Borgonovi, 2008; Hopkins, 2001; Otake et al., 2006; Walsh, 1999). Similarly, adolescent engagement in generative behavior (of which altruism is a part), was correlated with

feelings of peace, happiness, calmness, and better health in older age (Wink & Dillon, 2007). Adolescents who engaged in various types of service to others also demonstrated a greater sense of life purpose ($B = .18$, $p < .05$), self-acceptance ($B = .27$, $p < .01$), and personal growth ($B = .51$, $p < .001$; Schwartz et al., 2009). Additionally, altruism has been shown to reduce unhealthy mental qualities such as greed, jealousy, and egocentrism (Hopkins, 2001; Walsh, 1999).

Schwartz (2010) reported on peer supporters diagnosed with multiple sclerosis who were helping others through service work. This group of peer supporters identified decreases in their own depression symptoms, enhanced feelings of peace, and a greater sense of quietude through their helping work. The peer supporters also demonstrated quality of life outcomes three to seven times greater than did the individuals the peer supporters were serving (Schwartz, 2010). Schwartz, Meisenhelder, Ma, & Reed (2003) also discovered a positive correlation ($r = .68$) between providing help and support to others and better mental health, as long as helping others did not overwhelm the helpers. When serving others becomes overwhelming (when it becomes stressful for the individual) such service can negatively impact mental health (Schwartz et al., 2003). Borgonovi (2008) found that to an extent, the more an individual volunteered (e.g., one time per month versus none, weekly versus monthly), the greater the likelihood that he/she reported better health (volunteering less than one time per month: $B = .158$, $p < .01$, volunteering one time per week or more: $B = .225$, $p < .01$) and greater happiness (volunteering less than one time per month: $B = .194$, $p < .01$, volunteering one time per week or more: $B = .422$, $p < .01$). A person who volunteered less than once per month was 7% more likely to report being very happy compared to individuals who did not engage in volunteer work. A person who volunteered more than monthly but less than weekly was 12% more likely to report being very happy, and people who volunteered weekly were 16% more likely to report being very happy. There are differences

in benefits when helping is based on pleasure prosocial motivation compared to when the helping is based on pressure prosocial motivation (Gebauer et al., 2008). Pleasure-based prosocial motivation, in which individuals help others for the joy it brings them, was found to be positively correlated with self-actualization ($B = .56$, $p < .001$), self-esteem ($B = .27$, $p < .001$), life satisfaction ($B = .27$, $p < .01$), and positive affect ($B = .32$, $p < .001$), and was negatively correlated with negative affect ($B = -.18$, $p < .001$). Pressure- based prosocial motivation, in which others feel obligated to serve others, was found to be unrelated to self-actualization, self-esteem, life satisfaction, and positive affect, and was significantly positively correlated ($B = .23$, $p < .001$) with negative affect.

Limited research has been conducted examining the effects of engaging in altruistic behavior on specific anxiety and depressive disorders. Fujiwara (2007) found a small beneficial and protective impact (OR = .47, $p < .01$) of altruistic behavior on incidence of Generalized Anxiety Disorder, but a significant negative effect for individuals with Major Depressive Disorder, such that greater altruistic behavior was correlated with higher rates of depression (one-unit increase in frequency of altruistic behavior led to a 16% increased chance of developing depression). These results suggest that for individuals struggling with depression, attempting to find the energy and motivation to engage in helping behaviors may do more harm than good.

Interactions with other TLCs. Being of service to others and engaging in altruistic behavior have been shown to be related to other TLCs, particularly religion and spirituality. A study conducted within the Presbyterian Church found that those giving help had better mental health than did the people receiving that help (Schwartz et al., 2003). Borgonovi's (2008) results demonstrated that people who volunteered within religious groups and organizations ($b = .173$)

showed greater self-reported health and happiness than individuals who did not volunteer as well as people who volunteered for a secular group (b = .087). Finally, Schwartz and colleagues (2009) identified that adolescents were more likely to engage in altruistic behavior if they engaged in religious coping (r = .061) or physical activity (r = .138).

Stress Management and Relaxation

Stress management and relaxation techniques come in many forms, including arts-based, psycho-educational, and cognitive/behavioral/mindfulness-based (Regehr, Glancy, & Pitts, 2013). This TLC can include tai chi, progressive muscle relaxation, meditation, art, music, yoga, aromatherapy, and much more (Impett et al., 2006; Lipe et al., 2012; Redstone, 2015; Walsh, 2009). Stress management and relaxation have been defined as the processes of managing and coping with the stress and distress that people experience on a regular basis (Khoury, Sharma, Rush, & Fournier, 2015; Regehr et al., 2013; Tripathi & Bano, 2014). There is evidence that proves the usefulness of these various stress management and relaxation techniques in both psychologically distressed and "healthy" populations, as will be discussed (Walsh, 2009).

Mechanisms of impact. Engaging in stress management and relaxation techniques provides individuals with the time to focus on their well-being, time to recharge and refuel, and time to rejuvenate. Certain stress management and relaxation techniques target the body's physiological relaxation processes. For example, deep breathing triggers the body's relaxation response via the parasympathetic nervous system (Edenfield & Saeed, 2012).

Engaging in mindfulness meditation have been shown to lead to relaxation and stress management responses (Broderick & Metz, 2009). Mindfulness meditation leads to feelings of well-being, health, and relaxation through allowing individuals the opportunity to develop greater awareness, compassion, and insight around their thoughts and feelings instead of

attempting to ignore or change them. Through the greater attention, awareness, and acceptance that mindfulness meditation can bring, depression, anxiety, worry, and anger can be reduced (Edenfield & Saeed, 2012). Decentering, allowing oneself to consider multiple perspectives rather than just their own subjective ones, is another means through which mindfulness meditation may help relieve depression symptoms.

Benefits. Reduced stress has been evidenced as one benefit of engaging in stress management and relaxation, such as yoga, art therapy, and music therapy (Noggle, Steiner, Minami, & Khalsa, 2012; Tripathi & Bano, 2014). Participants from a clinical sample who engaged in an arts and music intervention demonstrated overall decreases in stress ($t = 1.61$, $p = .06$, near but not quite at a significant level as their baseline stress levels were rather low) as well as immediate reductions of stress and enhanced feelings of "relaxation" (Lipe et al., 2012).

Practicing stress management and relaxation can increase positive affect, satisfaction with life, and self-acceptance, and can decrease negative affect. Impett and colleagues (2006) discovered that their small sample of participants who engaged in yoga for several months experienced all of these self-reported benefits. Participants who more frequently practiced yoga demonstrated slightly better improvements in life satisfaction ($r = .14$) and emotional benefits, such as enhanced positive affect ($r = .25$) and decreased negative affect ($r = -.15$). Each hour of yoga participation was associated with a .25-unit increase in positive affect for that week. Also, greater frequency of weekly yoga engagement was related to greater positive affect, less negative affect, greater life satisfaction, and greater body awareness ($p = .06$). Yoga has been identified as a prime stress management technique and one that positively impacts psychological health, reducing stress in participants, improving mood disturbance, improving mood states, and reducing tension and anxiety (Noggle et al., 2012; Tripathi & Bano, 2014).

An additional benefit of engaging in relaxation training (e.g., progressive relaxation training, behavioral training, autogenic training) is that it has been found to reduce symptoms of anxiety, according to several recent meta-analyses (Manzoni, Pagnini, Catelnuovo, and Molinari, 2008; Regehr et al., 2013). Across 27 studies, relaxation training had a medium-large effect size (.57) in the treatment of anxiety.

Martial arts in various forms (e.g., Kouk Sun Do, tai chi) has been found to provide relaxation, enhance psychological well-being, reduce anxiety ($F = 7.86$, $p < .05$), decrease depression ($F = 12.45$, $p < .01$; ES = -5.97), reduce stress, enhance positive mood, enhance quality of life, and increase self-esteem compared to individuals who do not engage in these relaxation processes (Kim, Yang, & Schroeppel, 2013; Wang et al., 2014). Biofeedback is another stress management technique, one that is positively linked to quality of life (Schneider, 1987). Biofeedback is a form of stress management and relaxation that focuses on changing the way the body physiologically responds to stressors.

Mindfulness meditation is currently a popular research topic, and scholars are curious about the effects of engaging in mindfulness meditation on a regular basis. Bell (2015) studied the effects of engagement in mindfulness meditation for 30 minutes per day, 4 days per week, for 12 weeks, in a non-clinical sample. Results demonstrated statistically significant decreases in depression ($F = 14.58$, $p < .05$, partial $n^2 = .482$), anxiety ($F = 12.46$, $p < .01$, partial $n^2 = .664$), blood pressure ($F = 3.62$-8.48, $p < .05$, partial $n^2 = .531$-$.862$), and heart rate ($F = 5.79$, $p < .05$, partial $n^2 = .716$; Bell, 2015). A pilot study examining the effects of a mindfulness meditation intervention infused with aromatherapy on stress and anxiety for in-patient psychiatric patients, demonstrated that mindfulness meditation plus aromatherapy intervention significantly reduced stress and anxiety in almost all participants; anxiety and stress were reduced by 33% based upon

self-report (Redstone, 2015). Engagement in a mindfulness curriculum brought about reduced negative affect ($t = 2.34$, $p < .05$) and increased calm, relaxation, and self-acceptance ($t = -2.06$, $p < .05$; Broderick & Metz, 2009). Mindfulness programs that are internet-based have also proven to be effective at reducing stress, increasing psychological well-being, increasing vitality, and increasing quality of life (Morledge et al., 2013). One mindfulness program in particular included education, guided meditations, and ways to manage stress and incorporate mindfulness daily. Outcomes demonstrated that engaging in more frequent meditation practices per week had small effects on stress ($r = -.20$). Mindfulness-based stress reduction has been found to be beneficial to healthy individuals as well as clinical populations in reducing stress, enhancing subjective well-being, increasing life satisfaction, and enhancing positive emotions (Khoury et al., 2015; Sharma & Rush, 2014). Mindfulness-based stress reduction has been found to have moderate to large effect sizes on reduction of mental health disorder symptoms in a meta-analysis. Klainin-Yobas, Cho, and Creedy (2011) found effect sizes ranging from d = .29-1.65 across 17 studies.

Interactions with other TLCs. The stress management and relaxation techniques I discussed incorporate physical activity, spending time with nature, or social interaction of some kind (Edenfield & Saeed, 2012). For example, much of the "relaxation" music available to consumers consists of nature sounds (e.g., a babbling brook, wind rustling leaves, rain, forest sounds). Also, biofeedback software available for consumers often includes nature scenes and settings, as natural settings have been found to have refreshing and beneficial effects on stress and well-being.

Religion and Spirituality

Engaging in religious or spiritual practice is an important method of coping with stress, illness, and mental health concerns, which research has validated (Berry & York, 2011; Walsh, 2009). Many people utilize religion as a coping mechanism to deal with life stressors, and they identify this practice as providing comfort and support during times of distress (Koenig, King, & Carson, 2012). Religion and spirituality can certainly bring about positive results, but in some cases religion and spirituality can have adverse effects, such as when it increases guilt, enhances negative views of self, or instills a minority identity (Bowman & Small, 2012; Weber & Pargament, 2014).

Defining religion and spirituality is challenging. Berry and York (2011, p. 77) as well as Koenig et al. (2001) used the terms interchangeably and defined them as: "a multidimensional construct that reflects a level of commitment to that which is sacred." The operational definition of religion and spirituality included the components of: motivation, meaning, coping, behavior, and beliefs. A meta-analysis conducted by Sawatzky, Ratner, and Chiu (2005), however, noted the importance of distinguishing between religion and spirituality and provided a comprehensive and specific definition of spirituality. This definition of spirituality included: a relationship to the supernatural, the existential search for meaning and purpose, defined by individuals' subjective experiences, and not necessarily identifying as religious. When reviewing the literature, I clearly distinguished between religion and spirituality as appropriate.

Identifying as religious in some manner and aligning with a religion, versus specific religious affiliation (e.g., Christianity, Hinduism, Judaism), has been identified as having a buffering factor against mental health concerns and providing the other benefits enumerated below (Jansen, Motley, & Hovey, 2010). There are not major differences in well-being between

individuals of different religions, rather differences are found when comparing those who identify as religious or spiritual and those who do not. For example, there were no significant differences between Catholics and Protestants in rate and level of depression and anxiety.

Mechanisms of impact. How and why religion and spirituality buffer against depression is still not well understood. Berry and York (2011) examined religion and spirituality as moderators on the relation between stress and depression, hypothesizing that greater levels of religion and spirituality would reduce the impact of stress on depression (Kim, 2008; Kirchner & Patiño, 2010). Berry and York (2011) found that three aspects of religion and spirituality, including spiritual meaning (r = -.14), religious coping (r = -.22), and beliefs about God (r = -.18), all, if weakly, significantly inversely correlated with depression. Religious coping was also found to have an inverse correlation with stress (r = -.23); and, spiritual meaning (r = -.14), religious coping (r = -.26), and beliefs about God (r = -.15) were all significantly, if weakly, negatively linked with cognitive vulnerability to depression. Of these three aspects examined, the researchers concluded that religious coping as well as using religion and faith to help during times of distress were significant predictors of depression, stress, and cognitive vulnerability. However, a study conducted by Brown and colleagues (2013) discovered that religious coping styles were not significantly related to anxiety and depression, but that spiritual well-being was significantly directly correlated with anxiety and depression. They noted, though, that in their study religious coping styles and spiritual well-being were significantly correlated with one another, which means that these results need to be interpreted with caution and religious coping styles may actually be an important variable in depression. Additionally, identifying as religious can provide positive worldviews, a sense of control and predictability, answers to the unknown,

social support, role models, empowerment, hope, and a way to understand bad things that happen in life (Koenig et al., 2012).

Benefits. Religion and spirituality can lead to mental health benefits such as better psychological and relational well-being, and lower rates of depression, anxiety, substance abuse, and suicide (Koenig et al.., 2001). Bowman & Small (2012) found in their large-scale longitudinal study that religious involvement was connected with well-being in college students. Individuals who did not identify as religious were found to have reduced well-being compared to "mainline" Christian students. In addition, participating in religious activities (partial $r = .044$, $p < .001$) and attending a college with an inclusive religious climate were linked to increased student well-being. Religion and spirituality have been connected with well-being, positive affect, reduced negative affect, positive interpersonal interactions, a greater sense of purpose in life, self-acceptance, and life satisfaction (Greenfield et al., 2009; Murray & Ciarrochi, 2007). Religion and spirituality, specifically daily religious/spiritual experiences, were both directly and indirectly connected to hedonic well-being (life satisfaction, positive affect) through the mediating variable 'meaning in life' (Yoon et al., 2015). Organizational religious practices, private religious practices, and subjective spirituality were also positively correlated with well-being, but these effects were suppressed by the effects of daily religious and spiritual practices, suggesting that it was in fact daily religious and spiritual engagement that led to the benefits (Yoon et al., 2015). In a review conducted by Unterrainer, Lewis, and Fink (2014), dimensions of religious and spiritual well-being (hope, forgiveness, general religiosity, connectedness, and religious and spiritual well-being total) were inversely correlated with anxiety ($r = -.22$ to $-.42$), depression ($r = -.32$ to $-.55$), and suicidal ideation ($r = -.19$ to $-.56$). Sawatzky and colleagues (2005) conducted a meta-analysis examining the impact of spirituality on quality of life. Across

59 effect sizes from 48 studies involving over 22,000 participants, they established that there was a moderate relationship between spirituality and quality of life with a mean effect size of $r = .34$.

Greater religiosity has also been shown to be positively correlated with lower rates of depression and depression symptoms (Koenig et al., 2012). Research has demonstrated links between greater religiousness and less anxiety, such that six out of seven of the randomized control trials reviewed identified low-level inverse associations between religiousness and anxiety. Religious and spiritual engagement have also been identified as buffers and protective factors against depression and stress (Berry & York, 2011; Koenig, 2009). Religiosity and spirituality have also been shown to decrease depression (religiousness: $F = 8.21$, $p < .01$; spirituality: $F = 4.10$, $p < .05$), decrease anxiety (religiousness: $F = 4.66$, $p < .05$; spirituality: non-significant), and enhance quality of life (religiousness: $F = 9.45$, $p < .01$; spirituality: non-significant) compared to individuals without religiosity and spirituality (Corrigan, McCorkle, Schell, & Kidder, 2003).

Individuals who have identified as non-religious (e.g., atheists, agnostics) differed from individuals who identified as religious in positive psychological functioning characteristics ($F = 3.77$, $p < .001$), social support relationships ($F = 4.08$, $p < .001$), health behaviors ($F = 2.05$, $p < .05$), and well-being ($F = 3.77$, $p < .001$) such that those who identified as non-religious experienced less of these compared to those who identified as religious (Hayward, Krause, Ironson, Hill, & Emmons, 2016). These researchers found that the people who were religiously affiliated or indicated no religious preference reported greater happiness, higher self-esteem, lower anxiety, and more optimism compared to those who identified as atheist or agnostic. Similarly, Kugelmass and Garcia (2015) discovered that compared to their religious counterparts, nonreligious adolescents had higher rates of mental disorders (mood disorders,

anxiety disorders, behavioral disorders, substance abuse disorders), particularly among atheists and agnostics. There were also differences between individuals who identified as high religiosity and low religiosity in depression and anxiety (Jansen et al., 2010). Self-reported religiosity and religious influence were significantly negatively correlated with depression ($F = 7.59$, $p < .001$ and $F = 3.34$, $p < .05$ respectively), and church attendance was found to be significantly weakly inversely correlated with both depression ($r = -.15$, $p < .05$) and anxiety ($r = -.10$, $p < .05$).

In a sample of religious studies students, higher religiosity was correlated with many positive outcomes (Kioulos et al., 2015). More daily spiritual experience was related to less anxiety and insomnia ($r = .21$), less social dysfunction ($r = .15$), and less severe depression ($r = .22$; higher scores on the spiritual experience dimension corresponded to low levels of engagement in daily spiritual experience). Greater values and beliefs were correlated with less social dysfunction ($r = .15$) and severe depression ($r = .20$). Increased organizational religiousness predicted less anxiety and insomnia. Greater forgiveness (often touted in religion) was linked to less anxiety and insomnia ($r = .17$), social dysfunction ($r = .17$), and severe depression ($r = .28$). Intrinsic religiosity (internalized religious beliefs) has been demonstrated to be negatively associated with hopelessness ($r = -.25$), depression ($r = -.14$), and suicidal behaviors ($r = -.13$), versus extrinsic religiosity (using religion for personal and social benefits; Hovey, Hurtado, Morales, & Seligman, 2014).

Interactions with other TLCs. Involvement with religious or spiritual communities can afford individuals with opportunities for social interaction and being of service to others, two other important TLCs (Bowman & Small, 2012). Also along these same lines, having a meaningful relationship with a higher power (social support) and having a sense of purpose (being of service to others) are two reasons why religion and spirituality are beneficial (Brown et

al., 2013). Hovey and colleagues (2014) discovered that not only were religiosity and social support connected, but social-emotional support completely mediated the positive relation between religiosity and mental health. Although socio-emotional support fully mediated the relation between religiosity and mental health, religious communities provide ample opportunity for individuals to find socio-emotional support, social support systems, and opportunities for interaction.

Increasing Awareness and Knowledge of TLCs

Interventions designed to increase awareness and use of TLCs have been found to be extremely beneficial for health (Baydala et al., 2000). McClary, Pyeritz, Bruce, and Henshaw (1992) for example, found that a program developed for college students focusing on stress management, exercise, interpersonal skills, and nutrition had a long-lasting (2 year) positive impact on the students' quality of life. In another health promotion program, Godbey and Courage (1994) demonstrated that participation in a course focusing on nutrition, exercise, progressive relaxation, cognitive control, and time management strategies led to increases in participant self-esteem ($F = 9.82$, $p < .05$) and decreases in depression ($F = 8.68$, $p < .01$) and anxiety ($F = 7.79$, $p < .05$) immediately post-course completion.

Karwoski's (2008) dissertation study focused on a 12-session intervention designed to educate participants about six TLCs, including: physical activity, nutrition, light exposure, sleep, social support, and rumination. Results demonstrated 86% of participants who engaged in the treatment intervention experienced a 50% or greater reduction in depression scores, a statistically significant difference compared to participants in the control group ($F = 7.45$, $p < .01$). Young (2010) conducted a similar dissertation study, but with a single one-hour education session. Results signify that engagement in the education session increased adherence to the nutrition (*F*

= 8.05, $p<.01$) and sleep ($F = 3.52$, $p = .06$) TLCs immediately following the intervention. Participation in the education intervention also decreased likelihood of being diagnosed with major depression at a two-month follow-up; students who did not receive the education intervention were 13 times more likely to have depression.

Social Cognitive Theory

Bandura's Social Cognitive Theory (1977, 1978, 1986), renamed in 1986 from the original title of Social Learning Theory, is the theoretical lens through which I have constructed my study and the framework I used to understand and interpret my findings. Social Cognitive Theory diverged from a Skinnerian behavioral focus, with Bandura proposing that cognitive processes are deeply involved in learning, crucial to outcomes, and that behavior is not automatically reinforced and learned. This is not to say that learning never occurs outside of conscious awareness, but learning tends to be more efficient when cognitive processing is involved.

Self-efficacy expectations and outcome expectations are two of the main components of Bandura's Social Cognitive Theory. Bandura defined self-efficacy expectations as "the conviction that one can successfully execute the behavior required to produce the outcomes" (Bandura, 1977, pg. 79). Bandura defined outcome expectations as "a person's estimate that a given behavior will lead to certain outcomes" (Bandura, 1977, pg. 79). Both types of expectations are integral to the enactment of an action, and they are very different entities. People can have one of the expectations without the other, but the absence of one expectation source will negatively impact individuals' motivation and likelihood that a certain behavior will be produced. Both self-efficacy expectations and outcome expectations are domain-specific. A person can have high self-efficacy and positive outcome expectations in one area of their lives

(e.g., sports) and not in another (e.g., academics). The relation between these variables is described in the following manner: the relation between people and their behavior is moderated by self-efficacy expectations, and the relation between behavior and an outcome is moderated by outcome expectations.

Perceived self-efficacy is distinct from the actual skills and abilities to accomplish a task, and rests in the *belief* about an ability to accomplish the task. Bandura (1986) highlighted the importance of perceived self-efficacy in predicting performance above and beyond the ability of outcome expectations in predicting performance. However, if the outcome expected from an action is negative, as opposed to past successful positive outcomes resulting from that action, the motivation to perform that action is reduced. Enactment of an action does not rest solely on the perceived ability to perform the action (Bandura, 1977). This is an important distinction between acquisition of skills and utilization of those skills.

Self-Efficacy

Self-efficacy significantly influences motivation as well as the perseverance and effort expended in completing an action (Bandura, 1977). Greater self-efficacy is related to increased persistence toward an outcome goal despite obstacles and aversive experiences.

Elements of self-efficacy. Self-efficacy is derived from four main sources: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal (Bandura, 1977). Performance accomplishments most strongly impact self-efficacy expectations, as they are based upon behavioral successes from actual personal experience. Vicarious experience is the process of observational learning and observation of modeled behavioral successes carried out by others. Bandura asserted people believe that if others are capable of performing a given action, they too should be able to perform that action and achieve the same outcome. Verbal persuasion

(providing facts and reasons to inform and persuade about the benefits of a certain behavior), although one of the easier methods of building self-efficacy, tends to be a weaker and shorter-lived influence than the other methods of building efficacy expectations. Emotional arousal (heightened emotion, positive or negative, in response to an experience or situation) is influential due to human reliance on physiological senses to provide information about situations and determine reactions. In addition to these four sources, situational circumstances also impact self-efficacy expectations, in that certain situations may be more demanding of successful performance and ability and raise a greater risk of experiencing negative consequences due to behavioral failure (Bandura, 1977).

The subjective nature of self-efficacy leaves it open to influence and corruption by other factors in the environment. As self-efficacy is subjectively based upon individual perceptions, various experiences, and learning opportunities, it is possible that a given domain of self-efficacy can be over- or under-representative of actual ability. If self-efficacy is inflated without necessary skills, an individual could engage in a behavior that will not have a positive outcome, which could lead to an unnecessary failure and bad learning experience. This could prevent that individual from attempting to engage in that behavior in the future, even if in the future they could successfully engage in the behavior. Conversely, if self-efficacy is incorrectly deflated, an individual may avoid engaging in behaviors in which they could be successful (Bandura, 1986). Self-efficacy can even be considered as a protective factor, preventing bad outcomes from occurring and leading people to only look for situations in which positive outcomes will result. This way, a person will be successful and increase their self-efficacy instead of failing and experiencing a decrease in self-efficacy.

Observational Learning and Modeling

Three important processes are central to Social Cognitive Theory – vicarious, symbolic, and self-regulatory – and are identified as key contributors to psychological functioning (Bandura, 1977). Bandura asserted that humans learn through the consequences of their actions, as well as the consequences they witness resulting from others' actions (vicarious processes). If information about the benefits of an action is modeled for individuals, observational learning may be more effectively achieved than if individuals have to wait to perform the modeled behavior and experience the benefits. Observational learning can occur through behavioral modeling, verbal/written modeling, and symbolic modeling (e.g., television). Modeling can also lead to innovative behavior; for example, abstract modeling can provide individuals with a prototype that can then be altered to fit themselves and various contexts. Modeling can transmit information in a one-to-one format or it can be used to transmit information and model to large groups of people at once. Experience with certain action-consequence outcomes informs outcome expectations, which has a very important role in the enactment of behavior processes.

Self-Efficacy Expectations, Outcome Expectations, and Therapeutic Lifestyle Changes

Self-efficacy and outcome expectations have been found to be influential in health-promotive behavior (Bandura, 1995; Schwarzer & Fuchs, 1995). People have the capability to change their lifestyle and engage in healthier behaviors, if they have the requisite self-efficacy (Bandura, 1995). Bandura asserted that efficacy beliefs affect all phases of personal change, and that self-efficacy toward changing habits and lifestyles is key to determining whether health promotion changes will occur. Most importantly, this process of building self-efficacy to engage in different lifestyle choices requires the development of skills and abilities to accomplish such a change. Beginning a new lifestyle change, or giving up unhealthy behaviors, likely depends on

three types of beliefs: “expectancy that one is at risk (awareness),” “expectancy that behavioral change would reduce the risk (credibility),” and “expectancy that one is sufficiently capable of exercising control over a risky habit (self-efficacy)” (Schwarzer & Fuchs, 1995).

Perceived self-efficacy has been found to be a mediator of engagement in health behavior (Bandura, 1986). Previous studies have proposed the importance of self-efficacy effects on the relation between lifestyle intervention and outcome (Baydala et al., 2000). Self-efficacy has also been proposed to play a critical role on the impact of lifestyle factors on mental health, well-being, and stress reduction. Conceptually, Baydala and colleagues (2000) hypothesized self-efficacy to be an important mediating factor between exercise and managing stress during attempted changes in behavior to achieve desired outcomes. They suggested that when people do not feel able to successfully meet demands of a given situation, stress and anxiety can occur. In turn, increased self-efficacy can help regulate stress and anxiety by increasing feelings of personal control. They concluded that involvement in lifestyle and exercise intervention programs offer people the opportunity to increase their self-efficacy for overcoming obstacles and achieving daily goals (i.e., coping) via vicarious experience, mastery experiences, social persuasion, and physiological arousal.

Self-efficacy influences health behaviors (both directly and indirectly), ability to cope with mental distress, and ability to enact lifestyle changes (Bandura, 2004; Lazarus & Folkman, 1987). Self-efficacy also influences goals and aspirations, perceived outcomes, and perceptions of obstacles to the end goal. Bassler (1993) conducted a study in which perceived self-efficacy for engaging in specific health behaviors (nonsmoking, physical activity, healthy eating, and condom use) was the only significant variable remaining in a regression equation predicting behavioral intentions. Past behavior and perception of risk were non-significant predictors of

intent, supporting the importance of considering self-efficacy when evaluating intentions to alter current health-related behavior. Self-efficacy has also been found to be significantly positively related to health behaviors such as checking food expiration dates (OR = 1.08), monitoring physical changes (OR = 1.08), and getting a flu shot (OR = 1.03; Tsai et al., 2015). In fact, when compared with health locus of control and health literacy, health self-efficacy was the most consistent and positive association with the aforementioned health behaviors. Tucker and colleagues (2014) found that health self-efficacy, motivation to maintain health, using health self-praise, and active coping accounted for 30% of the variance in engagement in responsible health behaviors, 38% of the variance in healthy eating, 36% of the variance in regular exercise, and 38% of the variance in stress management behaviors.

Self-efficacy influences TLCs via the self-judgments that people make regarding their capability to increase exercise, eat healthier, and use relaxation techniques (O'Leary, 1985). Past studies have confirmed that self-efficacy is connected to the likelihood of utilization of certain health promoting behaviors, such as diet and nutrition (AbuSabha & Achterberg, 1997; Linde, Rothman, Baldwin, & Jeffrey, 2006). Schwarzer and Fuchs (1995) reviewed multiple empirical studies and documented the importance of self-efficacy in motivating people to engage in physical activity and to maintain engagement with nutrition health behaviors. Bandura (2004) and Leganger and Kraft (2003) examined the relation between fruit/vegetable consumption self-efficacy, intent to consume fruits/vegetables, and actual consumption of fruits/vegetables. Path analysis demonstrated that greater fruit/vegetable consumption self-efficacy led to greater intention to engage in the behavior (p coefficient = .24), as well as actual enactment in the behavior (p coefficient = .60). Sheeska, Woolcott, and MacKinnon (1993) found via structural equation modeling that self-efficacy to engage in healthy eating behaviors directly influenced

intentions to eat healthy (B = .41), filling the identified gap between awareness and intention to enact a behavior.

Exercise self-efficacy, perceived barriers to exercise, perceived benefits from exercise, and participant sex, were found to be important predictors of exercise behavior and accounted for 11% of the variance in exercise behavior (Chan, 2014). Results also demonstrated that greater exercise self-efficacy was correlated with less perceived barriers to exercise (r = -.18).

Outcome expectations and self-efficacy expectations have been found to be an important mechanism impacting sleep behavior. Digdon (2010) examined college students' outcome expectations and self-efficacy beliefs for adhering to healthy sleep recommendations. Results indicated that outcome expectations and self-efficacy beliefs varied by specific sleep recommendation and self-identification as a good or poor sleeper. Participants with low self-efficacy toward sleeping were more likely to fail to anticipate the negative consequences of napping, smoking, late exercise, late caffeine consumption, and doing "non-restful" activities (e.g., schoolwork, watching TV) in bed as being detrimental to sleep.

Sawatsky and colleagues (2012) reported that college students demonstrating greater self-efficacy for stress management reported lower depression scores than those with lower self-efficacy for stress management. These authors conducted mediation analyses with two different samples, and in both samples self-efficacy for stress management partially mediated (37% to 55%) the relation between stress and depression.

Serrano Ripoll and colleagues (2015) investigated differences between providing very specific TLC use instructions versus empowering the participants to try their best to incorporate TLCs and to do so in their own manner. Results between the two conditions were not statistically significantly different, although the researchers had originally hypothesized that the specific

instruction group would demonstrate significantly greater reductions in depressive symptoms. In addition, results demonstrated that participants in the control condition (no specific instruction) had statistically significant less anxiety symptoms at 6 months follow-up (but not at 12 months) compared to the specific instruction condition (imputed difference = -9.9, $p < .05$). The authors considered several possible reasons why the active condition did not demonstrate statistically significant results over the control condition, as had been found in a previous study (Garcia-Toro et al., 2012). Garcia-Toro and colleagues (2012) identified that participants in the active group (same conditions as the study conducted by Serrano Ripoll et al., 2015) demonstrated statistically significant differences in depression scores. Serrano Ripoll and colleagues (2015) suggested that compliance to the treatment recommendations provided, levels of social support, or inadequate interventions may have been causes of their inconsistent findings. However, I propose different influential factors, including: self-efficacy, locus of control, and credibility expectations, as will be explained in the present study section.

Rationale

I chose to utilize Social Cognitive Theory (SCT) as the guiding framework for my study. SCT is a primary theory in the field of counseling psychology, one with which a significant amount of counseling psychology research has been generated, a common theory base to which doctoral students in counseling psychology are exposed, and one with which I have become very familiar (Brown & Lent, 2000; Brown & Lent, 2008). Additionally, SCT has been applied to various examinations of lifestyle and health behaviors, providing understanding of the process of human behavioral engagement (Bandura, 1995; Schwarzer & Fuchs, 1995).

Alternate theories have been used to frame health-related or habit formation research, such as the Theory of Planned Behavior (TPB; Ajzen, 1991). Similar to SCT, TPB incorporates

similar constructs, such as behavioral control, which is similar to the SCT construct of 'self-efficacy.' Within TPB, the construct of behavioral control is integrated into a general framework of relations among beliefs, attitudes, intentions, and behavior (Ajzen, 1991).

Both SCT and TPB have been proven to be good frameworks for lifestyle behavioral change research. For example, Dzewaltowski, Noble, and Shaw (1990), explored both SCT and the TPB in connection to participant engagement in physical activity. Although within TPB, attitude and perceived control predicted intention, and intention predicted physical activity, the SCT construct of self-efficacy also significantly predicted physical activity and engagement in physical activity more so than TPB-based perceived control and intentions. Similarly, Jekauc and colleagues (2015) found in a similar comparison of SCT and TPB, that SCT was a better predictor of physical activity. Given the evidence that SCT adequately predicts variables influencing lifestyle behaviors and is commonly found in counseling psychology research, I chose to utilize this theory in my study.

Locus of Control

Locus of control (LOC) is a stable belief about where the putative nature and control of obtaining a certain outcome lies (Rotter, 1966). There are two forms of LOC – internal and external. Internal LOC concerns the belief that an outcome of behavior is based on an individual's own behavior and personal characteristics. External LOC concerns the belief that an outcome of behavior is based on chance, luck, fate, powerful others, or is simply unpredictable. Individuals will differentially attribute an event as a reward or reinforcement based on their sense of internal versus external control.

Identifying an outcome as due to either an internal or an external LOC will accordingly determine differences in individuals' behavior (Holden & Rotter, 1962; James & Rotter, 1958;

Phares, 1957, 1962; Rotter et al., 1961). Individuals with an internal LOC are more likely to take action to better their life conditions (Gore & Rotter, 1963), are more likely to learn and remember information impacting their future goals (Seeman, 1963; Seeman & Evans, 1962), and tend to be more focused on personal abilities in achieving outcomes (Efran, 1963). Rotter and colleagues (1961) demonstrated that individuals learn best in a situation that is perceived as being under internal control rather than external control. When the outcome of a specific situation is perceived as being accomplished by personal ability, individuals learn to a greater extent what to expect for future outcomes in similar situations. If an accomplishment is not based upon perceived individual control, expectancy effects for future outcomes will not increase (Rotter, 1966; Rotter et al., 1961). Perceived internal control and access to achievement opportunities are positively correlated such that cultivating a sense of internal control over a desired outcome when limited or no access to the achievement opportunities exist is difficult (Lefcourt, 1982).

How individuals interpret successes and failures, and how individuals believe reinforcements are determined, leads to a generalized expectancy of internal versus external control (Bandura, 1954; Lefcourt, 1982). Whether individuals identify as having an internal or an external LOC can impact their decision-making and activity completion. Rotter and Multry (1965) found that students who had generalized expectancies of an internal LOC spent significantly more time making a decision based on personal "skill" than they did when making a decision based on "chance," and also spent significantly longer making a decision in a skill-based task than did individuals with generalized expectancies of an external LOC. Individuals with generalized expectancies of external LOC spent greater time deciding on "chance" activities than on "skill" activities (non-significant trend). Individuals with generalized expectancies of an

internal LOC have also been shown to be more willing to delay gratification as well as engage in uncomfortable activities during an interim, if the long-term goal surrounding the decision was considered desirable (Lefcourt, 1982).

Locus of Control and Mental Health

Many studies have examined the direct link between LOC and mental health; although limited research has focused on how much perceived control people have regarding their mental health. This is a notable gap in the literature, as the perceptions individuals have regarding how their mental health is controlled is an extremely important variable. Both generalized expectancies of an internal or external LOC can have significant implications for individuals' intent to act.

Overwhelmingly, the research supports the positive impact of possessing an internal LOC on mental health and well-being variables. For example, Shojaee and French (2014) found that for college students, possessing an internal LOC was statistically significantly positively associated with several dimensions of well-being, including: life purpose (r = .34), self-acceptance (r = .28), positive relations with others (r = .23), autonomy (r = .21), mastery over environment (r = .28), and personal growth (r = .20). Possessing an external LOC was significantly negatively associated with these same dimensions of well-being.

Studies have also examined relations between LOC and specific mental illnesses. Hoffart and Martinsen (1991) found that an external mental health LOC was more highly endorsed in a group of agoraphobic patients than in non-anxious or depression patients. Further, over time, decreased levels of internal mental health LOC correlated with relapse after treatment had ended. In a meta-analysis, Presson and Benassi (1996) found less internal LOC (ES = .19) and more external LOC (r = .31) was significantly related to greater depressive symptomology. Also,

Wood and Letak (1982) found psychotic individuals reported greater external mental health LOC and non-psychotic individuals reported greater internal mental health LOC, F (2171) = 6.84, p < .001.

Locus of Control and TLCs

Connections among LOC, engagement in healthy behaviors, and engagement in several TLCs have also been examined. Tsai and colleagues (2015) asserted that if individuals believed themselves to have control over their health and health-promoting behaviors, they were more likely to engage in those behaviors and promote their health, while perceiving lack of control was negatively associated with engagement in health behaviors (OR = .93-.99). Other research (Bennett, Norman, Moore, Murphy, & Tudor-Smith, 1997; Callaghan, 1999; Duffy, 1997; Norman, Bennett, Smith, & Murphy, 1997, 1998; Steptoe & Wardle, 2001; Wallston & Wallston, 1978, 1982; Wallston, 1991) has indicated that an internal health LOC predicts utilization of preventative health behaviors, and that internal LOC has been significantly linked to health behaviors such as exercise (partial r = .094), diet and nutrition (partial r = .056-.090), smoking cessation, and alcohol consumption. Specifically, college students with high internal LOC and low external LOC demonstrated significantly greater (more positive) health lifestyle scores than their counterparts (Long, Williams, Gaynor, & Clark, 1988).

Whether it is a specific health LOC or more general LOC that significantly influences TLC utilization is not yet known and there are studies supporting both sides of this issue. There is also some question as to which type of LOC, internal or external, is more predictive of TLC use. Burk and Kimiecik (1994) determined that exercise LOC was a better predictor of exercise behavior than general health LOC (F = 4.73, p < .05). Results specifically showed that “powerful others” external exercise LOC (i.e., the outcome is controlled by powerful individuals within the

person’s life) and participants' value of exercise interacted to become the main significant predictor of exercise behavior, with internal LOC for exercise being non-significant. Duffy (1988) found that greater self-esteem, higher internal health LOC, a lower “chance” external LOC (i.e., the outcome is controlled by chance), and current health status, were correlated with nutrition, exercise, and interpersonal support, such that 25% of the variance in these health promotion behaviors were accounted for. Conversely, Cobb-Clark, Kassenboehmer, and Schurer (2014) found that a generalized LOC was statistically significantly related to diet and nutrition and more general maintenance of healthy habits. Individuals who endorsed a higher level of internal LOC were statistically significantly more likely to eat healthy (e.g., consume fruits, vegetables, low fat milk, and avoid fatty foods), exercise more frequently, and have more general healthy habits, such that for each standard deviation increase in internal LOC, there was a 1.1 standard deviation increase in healthy eating habits.

Perhaps the TLC that has most been studied in connection with LOC is physical activity. Multiple studies have found that internal LOC impacts engagement in physical activity. Cramer and colleagues (2014) identified that internal health LOC predicted exercise frequency at three months post-intervention. Laffrey and Isenberg (2003) demonstrated that internal health LOC was not significantly related to engagement in physical activity.

Vincent, Sande, Read, and Giannuzzi (2004) suggested a need for balance between internal and external LOC. They found that possessing a higher level of external sleep LOC was correlated with greater perfectionism (partial $r = .32$), depression (partial $r = .34$), and anxiety (partial $r = .31$). Adults with chronic insomnia were more likely to endorse external sleep LOC ($F = 7.31$, $p < .01$), and less internal sleep LOC ($F = 22.61$, $p < .001$) compared to non-

insomniacs. In a follow-up study, Vincent, Walsh, and Lewycky (2010) found that the impact of computerized CBT on participants' insomnia severity was partially mediated by their sleep LOC.

As to religion and spirituality positively contributing to mental health and well-being, it is important to note that religions that de-emphasize internal LOC can negatively impact well-being (Osborne, Milojev, & Sibley, 2016). Internal LOC was found to be statistically significantly positively correlated with life satisfaction (r = .21) and negatively correlated with psychological distress (r = -.11). The positive effects that religion has on life satisfaction as well as the negative effect religion can have on well-being are both mediated by participants' level of internal LOC (Osborne et al., 2016).

Speake, Cowart, and Pellet (1989) examined level of health LOC and its relation to the extent to which lifestyle factors were adopted by participants. Level of internal LOC was associated with higher use scores for exercise, beneficial nutrition habits, stress management, and health responsibility. “Powerful others” LOC scores were negatively correlated with use of positive lifestyle factors; however, higher scores on the “powerful others” LOC subscale was associated with greater use of exercise and stress management. Also, individuals' level of an internal LOC accounted for 11.8% of the variance in use of exercise, 18% of the variance in adoption of good nutritional habits, 9.8% of the variance in use of stress management techniques, and 23.9% of the variance in a total lifestyle usage composite score.

Locus of Control and **Self-Efficacy, Outcome Expectations**

Humans strive to have control in their lives, and strong self-efficacy and outcome expectations can provide for that desired control (Bandura, 1995). When predicted outcomes are known, people can work to create positive outcomes and avoid negative outcomes. Control also comes into play when considering stress and stress reactions. When stressors or challenges in life

are perceived as being controllable, challenges are not nearly as stressful as when the challenge is perceived as being uncontrollable. Control is also related to self-efficacy expectations, in that if people feel they do not have the power (control) to exact changes, they will not try to do so (Schwarzer & Fuchs, 1995).

Summary

The research I have reviewed provides evidence that therapeutic lifestyle changes can foster positive mental health, enhance well-being, increase life satisfaction, reduce negative emotions, increase positive emotions, and act as a buffer against the development of mental health concerns (Berry & York, 2011; Blank et al., 2015; Blumenthal et al., 2007; Borgonovi, 2008; Bowen et al., 2013; Cervinka et al., 2012; Dale et al., 2014; Daly et al., 2015; Diener & Seligman, 2002; Dunn et al., 2005; Garcia-Toro et al., 2012; Howell et al., 2011; Impett et al., 2006; Joseph et al., 2014; Knapen et al., 2015; Kuo, 2015; Lipe et al., 2012; Lund et al,. 2010; Molina-Garcia et al., 2011; Ozbay et al., 2007; Post, 2007; Roberts & Duong, 2014; Ross & Hayes, 1988; Salmon, 2001; Schwartz, 2010; Thoits, 1995; Van Kim & Nelson, 2013; Walther et al., 2014; Walsh, 2009; Wolsko & Lindberg, 2013).

Interventions designed to increase awareness and use of TLCs have also been found to be extremely beneficial for improving recipients' mental health (Baydala et al., 2000; Godbey and Courage, 1994; McClary et al., 1992). To date, the focus of TLC intervention use on the improvement of mental health has largely been assessed via the impact these interventions have on depression, and less focused on examining the impact of a TLC intervention on individuals' intent to engage in more frequent TLC behaviors. This is an important outcome variable to focus on, as TLCs are frequently underestimated and underutilized even though evidence suggests they can lead to numerous mental health benefits (Angell, 2009). As such, in my study I incorporated

an intervention designed to increase knowledge about, and enhance self-efficacy and outcome expectations for, engaging in TLCs. I assessed the effectiveness of the intervention in increasing intent to engage in TLCs beyond current baseline use as well as post-intervention follow-up use. Additionally, I examined the impact of mental health locus of control on TLC engagement and explored participant TLC preferences.

Self-efficacy has been found to be an important variable in understanding engagement in health-promotive behavior (Bandura, 1995; Schwarzer & Fuchs, 1995). Bandura indicated within his Social Cognitive Theory (1977) that self-efficacy for engaging in specific behaviors has a moderating influence on engagement. However, multiple studies in the TLC literature have found that self-efficacy for engaging in TLCs also acts as a mediator on engagement (Leganger & Kraft, 2003; Linde et al., 2006; Sawatsky et al., 2012; Schwarzer and Fuchs, 1995). As well, researchers have conceptually discussed the utility of considering self-efficacy to be a mediating variable when examining behavior changes (Bandura, 1986; Baydala et al., 2000). When individuals have confidence in their capability to successfully enact lifestyle changes (self-efficacy), they are much more likely to attempt to engage in these behaviors and persevere through obstacles that may arise (Bandura, 1977, 1995). Self-efficacy influences TLC use through the personal estimations that individuals make regarding their ability to engage in those TLCs (O'Leary, 1985). If individuals do not have confidence in their ability to carry out a desired action (e.g., consistently get adequate sleep), they are much less likely to attempt to engage in the action for fear of failing to achieve the desired behavior (Bandura, 1977, 1986).

Locus of control has been found to be an important predictor of engagement in health behavior (Holden & Rotter, 1962; James & Rotter, 1958; Phares, 1957, 1962; Rotter et al., 1961; Tsai et al., 2015). Specifically, holding a primarily internal LOC enhances the likelihood of

engaging in actions that result in changes to improve life outcomes, such as engagement in TLCs (Gore & Rotter, 1963; Long et al., 1988). For example, physical activity, diet and nutrition, and religion and spirituality, are three TLCs found in the literature to be impacted by individuals' sense of LOC (Bennett et al., 1997; Callaghan, 1998; Duffy, 1997; Norman et al., 1997, 1998; Osborne et al., 2015; Speake et al., 1989; Steptoe & Wardle, 2001; Wallston & Wallston, 1978, 1982; Wallston, 1991). Researchers have also identified that higher levels of internal LOC and lower levels of external LOC positively impact mental health and well-being (Presson & Benassi, 1996; Shojaee & French, 2014). LOC influences TLC use through the personal beliefs that individuals have regarding the extent to which engaging in desired behaviors (such as TLCs) are under their control (Schwarzer & Fuchs, 1995). If individuals do not believe that their ability to make a desired change to bring a desired outcome is under their control (e.g., consistently get adequate sleep), they are much less likely to attempt to engage in the action for fear of failing to achieve the desired behavior or have the behavior result in a desired change.

Importantly, researchers have rarely examined the link between self-efficacy and locus of control, and when this has been done, investigators have not conceptualized how LOC may mediate or moderate relations among health behaviors (e.g., Tsai et al., 2015). Despite this limited research, it seems clear that LOC and self-efficacy are likely connected. Schwarzer and Fuchs (1995) found that when people feel they do not have the power (control) to exact health related changes in their lives, they will not attempt to do so. Bandura’s Social Cognitive Theory (1977) also supports the assertion that self-efficacy and LOC are likely connected. Locus of control can be considered as somewhat related to outcome expectations, in that if an individual possesses an external LOC for a particular behavior, their outcome expectations may be rather weak. The importance of understanding both self-efficacy expectations and outcome

expectations in the process of engaging in a behavior has been firmly supported in past self-efficacy research and theory (Bandura, 1977, 1986).

Present Study

In the present study, I focused on a sample of college students and the effects of a self-efficacy based TLC intervention on students' intent to adopt higher levels of TLC use beyond their current baseline as well as post-intervention engagement in therapeutic lifestyle behaviors. As well, I examined the potential moderating and mediating effects of self-efficacy to engage in TLCs, outcome expectations, and mental health locus of control, on the relation between students' current baseline TLC use and post-intervention intentions to increase their use of TLCs beyond their current baseline.

Past studies have typically focused on one TLC or a few TLCs; rarely has a more complete group of eight TLCs been examined in a single study. I have added to the literature by examining the indirect effects of self-efficacy to engage in TLCs, outcome expectations, and mental health locus of control, on students' intent to utilize TLCs and post-intervention follow-up engagement in TLCs. The main purpose of my study has been to better understand what elicits students' intent to increase their use of TLCs, as well as to identify the effect that incorporating a self-efficacy building component into information-sharing can have on students' intent to increase their use of TLCs.

The collegiate years are a time when anxiety and depression are more likely to manifest in students (APA, 2013). For these reasons, it is important that college students be educated about the ability they have to manage their mental health and incorporate lifestyle changes to help promote their physical and mental health throughout their lives. Programmatic outreach and

intervention efforts within a college setting can also reach large groups of people who can be educated on these issues.

In the past, researchers have expressed the need to do more than enhance the knowledge of individuals if interventions are going to influence them to make and maintain lifestyle changes (Nutbeam, 2005). Simply increasing students' awareness of the benefits of TLCs, and providing instructions of how to use TLCs, may not be enough to relieve depression symptoms (Serrano Ripoll et al., 2015) and help students commit to lifestyle changes. The role of constructs such as self-efficacy expectations, outcome expectations, and locus of control, also need to be examined to find if mental health promotion interventions can actually lead to lifestyle changes (Nutbeam, 2005; Tones, 1986). Related, Hubley (2002) asserted that health change will not occur if only confidence and empowerment are provided without the components of knowledge and awareness. Therefore, the TLC intervention I employed included components of education, awareness enhancement, and sources for self-efficacy enhancement.

While there were many studies cited throughout the literature review, there are many concerns with the studies that have been conducted in this field. First, many of the studies had small sample sizes, limiting the degree of generalizability. Second, many of the studies used correlation analysis instead of more robust forms of assessment. Third, many of the studies I reviewed often demonstrated results that trended in certain directions but were not statistically significant, limiting the usefulness of the knowledge derived from these studies. Finally, many of the studies solely focused on the effectiveness of TLCs on fostering positive mental health, versus examining how to successfully dispense this important information.

The main goal of my study was to create awareness of the benefits of TLCs in promoting mental health in a way reminiscent of Pender’s Health Promotion Model (1987), which proposes

that the goal of health promotion is not to simply prevent disease but also to enhance well-being, fulfillment, and self-actualization. The incorporation of prevention-based efforts in health and lifestyle behaviors is imperative, given that lifelong health habits are formed during adolescence and are much more challenging to change once set (Bandura, 1995).

CHAPTER 3. METHOD

Participants

For an initial pilot study that was conducted to assess differences in self-efficacy expectations between two intervention conditions, I obtained a sample of 94 participants. Thirteen cases were removed for failing to complete the pilot study survey item, leaving 81 cases available for analysis.

For my main study, I sought a sample size of approximately 400 participants, based on the results of a power analysis (G*Power; Faul, Erdfelder, Buchner, & Lang, 2009). A total of 487 undergraduate students from a large midwestern university participated in the main study, with 247 of those participants also completing a one-week follow-up survey. In the main study, twenty-eight participants' cases were unusable for data analysis and had to be removed; the remaining 459 cases were included in data analysis. Similarly, 36 cases had to be removed from the follow-up survey responses, leaving a total of 211 cases for follow-up data analysis.

The main study sample had a mean age of 19 years (SD = 1.50) and consisted of 303 female participants (66% of the sample). Most of the sample identified as European American (75.6%), with 6.1% identifying as International students, 5.7% as multiracial, 4.8% as Asian American, 4.4% as Hispanic/Latino American, and 2.8% as African American/Black. Most participants were of either freshman or sophomore standing (79.7%). A highly similar distribution of age, race/ethnicity, and year in school was found for the follow-up sample.

All participants were recruited through the Department of Psychology SONA research system. Students were awarded one research credit for participating in the pilot study, three research credits for their participation in the main study, and one research credit if they participated in a brief follow-up survey. Participants were not allowed to participate in the main

study if they completed the pilot study, and only those participants who completed the main study were invited to engage in the follow-up study. Courses that required SONA research credits within the department included: Introduction to Psychology, Developmental Psychology, Social Psychology, and Introduction to Communication Studies. Each participant was enrolled in at least one of these courses, but could only take part in the study once.

Measures and Materials

Therapeutic Lifestyle Changes Use Assessment

The Therapeutic Lifestyle Changes (TLC) Use Assessment was an author-devised measure consisting of 32 items utilized to measure participants' current use of TLCs pre-intervention, and their intent to engage in TLCs beyond their current baseline use post-intervention. Sixteen items assessed TLCs (two items per each of the eight TLCs) and the other sixteen items were used to dilute the intent of these primary assessment items. Participants responded to the items using a 6-point Likert scale (1 = *not at all* to 6 = *all, you do this [TLC] weekly* for pre-intervention and 0 = *not at all* to 6 = *all, you will do this [TLC] weekly* for post-intervention). Participants were given the following pre-intervention instructions: "*In the past month*, *how much of the time have you*…?*"* Participants were given the following post-intervention instructions: "*To what degree do you intend to…during the next month*?" (see Appendix A).

Therapeutic Lifestyle Changes Self-Efficacy Assessment

The Therapeutic Lifestyle Changes Self-Efficacy Assessment (TLCSEA), used as both a pre- and a post-intervention measure, was author-devised and developed using a guide for constructing self-efficacy measures (Bandura, 2006). There were 16 items (two items per TLC) on the TLCSEA that asked participants to rate their confidence in their ability to engage in each

TLC. There were also 16 dilution items. An example TLC item was: *"Sleep 7-9 hours each night, creating a semi-routine sleep schedule"* (see Appendix B). Each item used a 6-point Likert scale (1 = *not at all confident* to 6 = *totally confident*). The time, length, or frequency detailed for each of the TLC items was based upon previous research (Bell, 2015; Blanchflower et al., 2013; Borgonovi, 2008; Centers for Disease Control and Prevention (CDC), 2008; Garcia-Toro et al., 2012; Grandner et al., 2005; Hartig et al., 2003; Hirshkowitz et al., 2015; Impett et al., 2006; Terman et al., 1989; Tripathi & Bano, 2014; Walther et al. 2014).

Lifestyle Change Interventions

There were two intervention conditions to which participants were randomly assigned: the "Control" intervention and the "TLC" intervention (see Appendix C). Both interventions consisted of a PowerPoint presentation with audio voiceover to convey necessary information and were approximately 15 minutes in length. I created and provided the audio voiceover for the TLC intervention; the Control intervention consisted of a PowerPoint presentation found on YouTube.

The Control intervention, created by Dr. Valerie Pennington (a.k.a., "The Penguin Prof;" Professor of Biology at Southwest University), concerned time management in college and the positive benefits of properly managing one's time (e.g., reduced stress and academic success). Permission to use this video was obtained from Dr. Pennington prior to data collection. After watching the presentation, participants in the Control condition were asked to respond to two items asking them about what they learned from the presentation as well as the benefits they imagined they would experience if they used what they had learned in the video.

The TLC intervention was author-devised and based upon interventions utilized in previous research (Mittelmark, 1999; Young, 2010). Previous research indicated that both brief

advice (1-2 minutes) and motivational interviewing (5-15 minutes), as well as internet programs teaching methods to reduce vulnerability for depression, have demonstrated an ability to offset depressive symptoms in adolescents, lower depressed mood in already depressed individuals, increase social support, and enhance protective factors that help guard against depression (Van Vorhees et al., 2008).

Based on these types of interventions, my video presentation was designed to offer participants general information about TLCs, the benefits each TLC has for enhancing mental health and well-being, as well as to enhance participant self-efficacy expectations for engaging in the eight TLCs. My video presentation included specific self-efficacy building elements via the specific routes indicated by Bandura (1977; i.e., performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal), such as: participants reflecting on and writing about their past experiences engaging in TLCs (performance accomplishments); brief written testimonials from graduate students in psychology on how engaging in TLCs has helped their mental health and well-being incorporated throughout the PowerPoint presentation (vicarious experience); a brief testimonial from an "expert" identifying the benefits of TLCs (I asserted myself as an expert by providing my credentials as a doctoral student, explaining my immersion in TLC literature, and highlighting how my presentation was based upon research from experts in the field; verbal persuasion); and, participant reflection on, and writing about, the positive feelings they would experience about themselves if they incorporated TLCs into their daily lives (emotional arousal).

To ensure the effectiveness of the TLC intervention, I drew upon the work of social psychological principles as outlined by Mittelmark (1999) and Edwards (1990), which significantly overlapped with Bandura's self-efficacy pillars. Mittelmark (1999) asserted that the

social psychology principles surrounding social influence can be utilized to create effective health intervention programs. Five of the nine types of social influence that were deemed important for prevention efforts (included in my TLC self-efficacy intervention) were appropriate for the scope of this study, including: education (presentation), persuasion (presentation from an expert encouraging increased use of TLCs), imitation (student testimonials), induced counter-attitudinal action (presentation from an expert, reporting of research, student testimonials), and conformity (student testimonials). Bandura (1995) also outlined four important components to include when attempting to induce personal change, including: supplying information (education provided in my TLC intervention), developing self-regulatory skills and an internal sense of locus of control (framing the presentation in a manner that conveys that individuals have the ability to enact the described changes in behavior), increasing self-efficacy through guided mastery experiences (providing information about how the changes in behavior can be enacted; vicarious experiences through the student testimonials), and identifying and utilizing social support systems (focusing on the social interaction elements of TLC use).

Mental Health Locus of Control Scale

The Mental Health Locus of Control Scale was adapted from the Multidimensional Health Locus of Control scales (MHLC), a family of scales based upon Rotter's Social Learning Theory with three different forms that were interrelated; however, only one need be used in any given study (Wallston, 2005; Wallston, Wallston, & DeVellis, 1978). The MHLC scales assessed both internal and external (powerful others and chance) locus of control (Wallston et al., 1978). Form A, from which I adapted my instrument, was comprised of 18 items evenly divided between three subscales – Internality, Powerful Others Externality, and Chance Externality

(Wallston et al.,1978). Each item was rated on a 6-point scale (1 = *disagree* to 6 = *fully agree*), and participants were instructed to rate how strongly they agreed with each of the 18 belief statements. An example item from the original scale was *"If I get sick, it is my own behavior which determines how soon I get well again."* To fit the purpose of my study, I adapted items to inquire about participants' agreement with belief statements regarding their mental health, and only utilized the Internality subscale. For example, the above statement was modified to read: *"If I develop a mental health problem, it is my own behavior that determines how soon I get well"* (see Appendix D).

The Multidimensional Health Locus of Control scales were initially developed via use of expert judges and winnowing down items according to item data analysis. Correlations of .57 (internal LOC), -.12 (powerful others), and -.14 (chance) were found between the MHLC subscales and subscales on Levenson's locus of control scale. Wallston et al. (1978) reported subscale inter-correlations of internal and powerful others = .12; powerful others and chance = .20; and internal and chance = -.29. Wallston (2005) reported alpha coefficients ranging from .60 to .75, and test-retest stability coefficients ranging from .60 to .70.

Outcome Expectations Assessment

The author-devised Outcome Expectations Assessment was 32 items in length and requested that participants *"…rate the degree of likelihood that your mental health will actually improve if you undertake each of the following activities [TLCs and dilution items]"* (see Appendix E). Participants responded to these items using a 6-point scale (1 = *not at all likely* to 6 = *totally likely*).

Preferences Assessment

The Preferences Assessment was an author-devised measure asking participants to *"…rank each of the following items, from most preferred to least preferred, in terms of which you would most prefer to actually increase beyond your current level of use"* (see Appendix F). The 32 items the participants were instructed to rank included TLC items (16) and dilution items (16).

Demographics

Participants answered demographic items soliciting information about sex, age, year in school, race/ethnicity, living arrangements, and social contacts (see Appendix G).

Procedure

Prior to collecting data, I obtained approval for this study from the Iowa State University Human Subjects Institutional Review Board (see Appendix L).

Pilot Study

I conducted a pilot study in order to ensure that the two intervention conditions were experienced by the participants as producing variable levels of self-efficacy to engage in TLCs. Participants signed up for the pilot study through the SONA system. Upon sign-up, participants were directed to a Qualtrics® survey site, where they provided informed consent to participate (see Appendix J) and then were randomly assigned to watch either the TLC or Control intervention. Following their viewing of the presentations, participants responded to one item asking them to "…*rate the extent to which the presentation you watched increased your confidence to successfully engage in the following behaviors: spend time with nature, get adequate sleep, engage in sufficient physical activity (exercise), maintain proper diet and nutrition, engage in social interactions, be of service to others, utilize stress management and*

relaxation techniques, and be involved with religion and spirituality" (see Appendix H). Participants responded to this item using a 7-point Likert scale (1 = *not at all* to 7 = *completely*).

Main Study

Participants elected to participate in the main study also through the SONA system. Upon sign-up, participants were directed to a Qualtrics® survey site, where they provided informed consent to participate (see Appendix K). After consent was obtained, participants completed demographic items, an assessment of their current TLC use, and a pre-assessment of their self-efficacy expectations for engaging in TLCs. Students were then randomly assigned to participate in one of the two intervention conditions, where they viewed one of the two video presentations and answered questions regarding what they learned from the presentation. Next, all participants completed an assessment of their intent to engage in TLCs beyond their current baseline use, a post-assessment of their self-efficacy expectations for engaging in TLCs, a measure concerning their mental health locus of control, a measure assessing TLC mental health outcome expectations, and a preference ranking of the TLCs they would most prefer to increase in usage.

Follow-Up

One week after participants completed the main study, I invited them to participate in a brief follow-up survey inquiring about their increased use (beyond baseline) of TLCs during the intervening week (see Appendix I). Participants responded to 32 items (16 devoted to TLCs and 16 dilution items) using a 6-point scale (1 = *not at all* to 6 = *a great amount*).

Research Questions and Hypotheses

Intervention Effects

Research Question 1. Will my self-efficacy enhancing TLC intervention statistically significantly impact participants' self-efficacy expectations to engage in TLCs beyond their baseline use, between pre- and post-intervention?

Hypothesis 1. I predict that participants in my self-efficacy enhancing TLC intervention will demonstrate a statistically significantly increase in their self-efficacy expectations to engage in TLCs beyond their baseline use, between pre- and post-intervention.

Research Question 2. Will my TLC intervention statistically significantly impact participants' post-intervention self-efficacy expectations to engage in TLCs to a greater degree than the Control intervention, after controlling for participant pre-intervention self-efficacy expectations?

Hypothesis 2. I predict participants exposed to my self-efficacy enhancing TLC intervention will report statistically significantly higher post-intervention self-efficacy expectations to engage in TLCs than participants exposed to the Control intervention, after controlling for participant pre-intervention self-efficacy expectations.

Research Question 3. Will my TLC intervention statistically significantly impact participants' TLC engagement at the one-week follow-up to a greater degree than the Control intervention, after controlling for participant pre-intervention TLC baseline use?

Hypothesis 3. I predict that participants in my self-efficacy enhancing TLC intervention will demonstrate a statistically significantly increase in their TLC engagement at the one-week follow-up above and beyond that of participants in the Control condition, after controlling for participant pre-intervention TLC baseline use.

Main Study (Post Efficacy Expectations, Outcome Expectations LOC, and Intent)

Research Question 4. Will participants' TLC outcome expectations statistically significantly mediate the relation between post-intervention self-efficacy expectations to engage in TLCs and participants' intent to engage in TLCs, after controlling for their baseline use and pre-intervention self-efficacy expectations?

Hypothesis 4. I predict participants' TLC outcome expectations will statistically significantly mediate (bring to a magnitude of zero) the positive direct relation between post-intervention self-efficacy expectations to engage in TLCs and participants' intent to engage in TLCs, after controlling for their baseline use and pre-intervention self-efficacy expectations.

Research Question 5. Will participant mental health locus of control statistically significantly moderate the relation between post-intervention self-efficacy expectations to engage in TLCs and TLC outcome expectations, after controlling for pre-intervention self-efficacy expectations?

Hypothesis 5. I predict that participants' mental health locus of control will statistically significantly moderate the relation between post-intervention self-efficacy expectations to engage in TLCs and participants' TLC outcome expectations. Specifically, when participants' self-efficacy expectations to engage in TLCs and their internal mental health locus of control are both at higher levels, participants' outcome expectations that TLCs will improve their mental health will also be at a higher level, after controlling for pre-intervention self-efficacy expectations.

Research Question 6. Will participant mental health locus of control statistically significantly moderate the relation between TLC outcome expectations and participants' intent to engage in TLCs, after controlling for their baseline use?

Hypothesis 6. I predict that participants' mental health locus of control will statistically significantly moderate the relation between TLC outcome expectations and participants' intent to engage in TLCs beyond their baseline use. Specifically, when participants' outcome expectations that TLCs will improve their mental health and their internal mental health locus of control are both at higher levels, participants' intent to increase TLC use will also be at a higher level, after controlling for their baseline use.

Follow-Up Assessment of Actual TLC Use at One Week

Research Question 7. Will participants' TLC outcome expectations statistically significantly mediate the relation between post-intervention self-efficacy expectations to engage in TLCs and participants' actual use of TLCs at one-week follow-up, after controlling for their baseline TLC use and pre-intervention self-efficacy expectations?

Hypothesis 7. I predict participants' TLC outcome expectations will statistically significantly mediate (bring to a magnitude of zero) the positive direct relation between post-intervention self-efficacy expectations to engage in TLCs and participants' actual use of TLCs at one-week follow-up, after controlling for their baseline TLC use and pre-intervention self-efficacy expectations.

Research Question 8. Will participant mental health locus of control statistically significantly moderate the relation between TLC outcome expectations and participants' actual use of TLCs at one-week follow-up, after controlling for their TLC baseline use?

Hypothesis 8. I predict that participants' mental health locus of control will statistically significantly moderate the relation between TLC outcome expectations and participants' actual use of TLCs at one-week follow-up. Specifically, when participants' outcome expectations that TLCs will improve their mental health and internal mental health locus of control are both at

higher levels, participants' TLC use at one-week follow-up will also be at a higher level, after controlling for TLC baseline use.

Research Question 9. Will participants' intent to increase TLC use beyond their baseline use statistically significantly moderate the relation between post-intervention self-efficacy expectations to engage in TLCs and participants' actual TLC use at one-week follow-up, after controlling for their TLC baseline use and pre-intervention self-efficacy expectations?

Hypothesis 9. I predict that participants' intent to increase TLC use beyond their baseline use will statistically significantly moderate the relation between post-intervention self-efficacy expectations to engage in TLCs and participants' actual TLC use at one-week follow-up. Specifically, when participants' self-efficacy expectations to engage in TLCs and intent to increase TLC use are both at higher levels, participants' actual TLC use at one-week follow-up will also be at a higher level, after controlling for their TLC baseline use and pre-intervention self-efficacy expectations.

CHAPTER 4. RESULTS

For the pilot study, after removing 13 cases from the original 94 for failing to respond to the pilot study item, 81 cases were utilized for analysis. A total of 487 students participated in the main study, with 247 of them also completing the follow-up survey. Twenty-eight main study cases and 36 follow-up study cases were removed due to incomplete responses. Therefore, 459 cases were utilized for data analysis in the main study, and 211 cases were utilized for follow-up (post-intervention change in TLC use) data analysis. For each instrument, at each measurement point, if a single item was left blank by participants, that participant's individual average rating for that instrument or subscale was used to replace the missing data point.

Descriptive Analyses

In this section, I present the means, standard deviations, bivariate correlations, and alpha coefficients of the TLC pre- and post-intervention Use Assessment (Pre-Use and Intent), Follow-Up TLC Use Assessment (Post-Use), TLC pre- and post-intervention Self-Efficacy Expectations Assessment (Pre-SE and Post-SE), Mental Health Locus of Control Scale (MHLOC), and Outcome Expectations Assessment (OE) measures (see Tables 1 and 2).

Table 1.

Means, SDs, and Ranges of Pre-Use, Intent, Post-Use, Pre-SE, Post-SE, MHLOC, & OE

Note. For Pre-Use, Intent, Pre-SE, Post-SE, MHLOC, and OE, n = 459. For Post-Use, n = 211.

Measures	*Mean*	*SD*	*Range*
1. Pre-Use	3.68	0.71	1-6
2. Intent	4.30	0.79	1-6
3. Post-Use	3.59	0.94	1-6
4. Pre-SE	3.91	0.75	1-6
5. Post-SE	4.15	0.83	1-6
6. MHLOC	3.84	1.03	1-6
7. OE	4.73	0.85	1-6

Table 2.

Correlations and Alphas of Pre-Use, Intent, Post-Use, Pre-SE, Post -SE, MHLOC, & OE

Note. For Pre-Use, Intent, Pre- SE, Post-SE, MHLOC, and OE, n = 459. For Post-Use, n = 211. *Coefficients significant at $p < .05$. **Coefficients significant at $p < .001$. Alpha coefficients are on the diagonal.

Measures	Pre-Use	Intent	Post-Use	Pre-Se	Post-SE	MHLOC	OE
1. Pre-Use	*.78*						
2. Intent	.70**	*.86*					
3. Post-Use	.61**	.59**	*.88*				
4. Pre-SE	.85**	.76**	.59**	*.81*			
5. Post-SE	.73**	.89**	.67**	.82**	*.87*		
6. MHLOC	.19**	.16**	.14*	.19**	.20**	*.81*	
7. OE	.49**	.71**	.46**	.57**	.71**	.24**	*.90*

Sex and Race/Ethnicity

To examine whether sex or race/ethnicity had a significant impact on the dependent variables (Intent and Post-Use), four one-way ANOVAs were conducted. As significantly more women and European American individuals participated in the study, the respective sub-samples that were created for comparative analyses contained a slightly disproportionate number of men and women (n = 301 for Intent; 143 for Post-Use) as well as European Americans and people of color (n = 237 for Intent; 105 for Post-Use). I found neither a statistically significant difference between men (M = 4.17, SD = 0.79) and women (M = 4.31, SD = 0.77) on intent, F (1, 299) = 2.37, $p > .05$, nor between men (M = 3.49, SD = 1.07) and women (M = 3.46, SD = 0.86) on post-intervention follow-up TLC use, F (1, 141) = 0.04, $p > .05$. With regard to race/ethnicity, I found neither a statistically significant difference between European American participants (M = 4.30, SD = 0.85) and participants of color (M = 4.16, SD = 0.84) on intent, F (1, 235) = 1.79, $p > .05$, nor between European American participants (M = 3.46, SD = 0.92) and participants of color

(M = 3.74, SD = 0.98) on post-intervention TLC use, F (1, 103) = 2.29, p > .05. Therefore, all participants were pooled for the remainder of analyses.

Pre-Intervention Therapeutic Lifestyle Changes Use Assessment Descriptive Data

The means, standard deviations, and inter-correlations of all Pre-Use items are presented in Tables 3 and 4. After removing the dilution items, the 16 TLC items were summed and divided by the total number of items to match qualitative anchors on the Likert scale. *Higher* scores indicated *greater* participant pre-intervention (baseline) TLC use. Items were in response to the stem "*In the past month*, *how much of the time have you…"* (see Appendix A).

Table 3.

Means and Standard Deviations of Pre-Use Items

Items	*Mean*	*SD*
1. Spent at least 30 minutes every day being outdoors	4.63	1.32
2. Spent at least 30 minutes every day viewing nature	4.00	1.50
3. Slept 7-9 hours each night as a routine sleep schedule	4.06	1.38
4. Maintained good sleep hygiene nightly (e.g., screen time)	2.26	1.43
5. Engaged in moderate physical activity for 2.5 hours per week	4.15	1.66
6. Exercised in some way and broke a sweat for 2.5 hours per week	3.94	1.76
7. Maintained a well-balanced diet, eating everything in moderation	3.90	1.39
8. Ate in a healthy way, every day	3.61	1.42
9. Spent at least 30 minutes per day talking with others	5.53	0.90
10. Spent at least 30 minutes per day interacting with others	5.56	0.87
11. Spent time volunteering to be of help to others once per week	2.96	1.52
12. Spent time dedicated to serving others once per week	3.20	1.57
13. Utilized deep breathing, yoga, or meditation for 2-4 hours per week	2.04	1.38
14. Engaged in peaceful, quiet, or relaxing activities for 2-4 hours	3.56	1.61
15. Reflected on the personal meaning of your religion or spirituality	3.00	1.81
16. Sought out information about your religion or spirituality	2.56	1.73

Table 4.

Inter-correlations of Pre-Use Items

Note. *Coefficients significant at $p < .05$. **Coefficients significant at $p < .01$. **Coefficients significant at $p < .001$.

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	-															
2.	.33**	-														
3.	.11*	.04	-													
4.	.05	.11*	.22**	-												
5.	.32**	.10*	.13**	.13**	-											
6.	.28**	.07	.09	.18**	.88**	-										
7.	.17**	.16**	.18**	.16**	.37**	.38**	-									
8.	.23**	.18**	.21**	.23**	.35**	.39**	.76**	-								
9.	.30**	.14**	.01	-.15**	.13**	.06	.10*	.09*	-							
10.	.30**	.14**	.05	-.17**	.17**	.11*	.13**	.10*	.81**	-						
11.	.19**	.16**	.00	.15**	.16**	.14**	.15**	.12**	.12*	.12*	-					
12.	.13**	.24**	.03	.20**	.19**	.14**	.19**	.16**	.09*	.08	.65**	-				
13.	.04	.22**	.02	.23**	.20**	.22**	.26**	.28**	-.12*	-.16**	.24**	.24**	-			
14.	.17**	.19**	.19**	.09	.07	.08	.22**	.25**	.11*	.11**	.18**	.15**	.34**	-		
15.	.03	.18**	.01	.10*	.14**	.15**	.23**	.24**	-.04	-.03	.23**	.29**	.29**	.18**	-	
16.	-.03	.14**	.02	.18**	.18**	.19**	.21**	.23**	-.06	-.04	.28**	.30**	.28**	.12**	.76**	-

Post-Intervention Therapeutic Lifestyle Changes Use Assessment (Intent) Descriptive Data

The means, standard deviations, and inter-correlations of all Intent items are presented in Tables 5 and 6. After removing the dilution items, the 16 TLC items were summed and divided by the total number of items to match qualitative anchors on the Likert scale. *Higher* scores indicated *greater* participant intent to increase their TLC use beyond baseline use. Items were in response to the stem "*To what degree do you intend to…during the next month?"* (see Appendix A).

Table 5.

Means and Standard Deviations of Intent Items

Items	*Mean*	*SD*
1. Spend at least 30 minutes every day being outdoors	4.93	1.22
2. Spend at least 30 minutes every day viewing nature	4.42	1.41
3. Sleep 7-9 hours each night as a routine sleep schedule	4.69	1.23
4. Maintain good sleep hygiene nightly (e.g., screen time)	3.75	1.43
5. Engage in moderate physical activity for 2.5 hours per week	4.81	1.33
6. Exercise in some way and break a sweat for 2.5 hours per week	4.71	1.38
7. Maintain a well-balanced diet, eating everything in moderation	4.67	1.20
8. Eat in a healthy way, every day	4.56	1.29
9. Spend at least 30 minutes per day talking with others	5.40	0.99
10. Spend at least 30 minutes per day interacting with others	5.42	0.94
11. Spend time volunteering to be of help to others once per week	3.64	1.46
12. Spend time dedicated to serving others once per week	3.76	1.47
13. Utilize deep breathing, yoga, or meditation for 2-4 hours per week	3.17	1.63
14. Engage in peaceful, quiet, or relaxing activities for 2-4 hours	4.31	1.40
15. Reflect on the personal meaning of your religion or spirituality	3.34	1.81
16. Seek out information about your religion or spirituality	3.13	1.79

Table 6.

Inter-correlations of Intent Items

Note. *Coefficients significant at $p < .05$. **Coefficients significant at $p < .01$. **Coefficients significant at $p < .001$.

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	-															
2.	.50**	-														
3.	.32**	.23**	-													
4.	.25**	.21**	.40**	-												
5.	.41**	.20**	.35**	.28**	-											
6.	.36**	.18**	.26**	.30**	.84**	-										
7.	.33**	.28**	.37**	.43**	.48**	.46**	-									
8.	.33**	.26**	.34**	.413**	.47**	.47**	.82**	-								
9.	.45**	.29**	.27**	.14**	.25**	.19**	.26**	.28**	-							
10.	.42**	.25**	.22**	.10*	.24**	.21**	.25**	.31**	.77**	-						
11.	.24**	.27**	.17**	.29**	.21**	.23**	.25**	.27**	.16**	.21**	-					
12.	.22**	.29**	.18**	.26**	.19**	.19**	.22**	.24**	.16**	.20**	.79**	-				
13.	.22**	.28**	.17**	.40**	.19**	.21**	.33**	.33**	.05	.50	.37**	.34**	-			
14.	.28**	.34**	.36**	.29**	.22**	.20**	.38**	.40**	.31**	.23**	.32**	.33**	.50**	-		
15.	.14**	.27**	.12*	.24**	.16**	.18**	.24**	.25**	.08	.07	.40**	.40**	.37**	.31**	-	
16.	.11*	.20**	.08	.25**	.10*	.14**	.20**	.23**	.01	.02	.39**	.40**	.41**	.25**	.82**	-

Follow-Up Therapeutic Lifestyle Changes Use Assessment (Post-Use) Descriptive Data

The means, standard deviations, and inter-correlations of all Post-Use items are presented in Tables 7 and 8. After removing the dilution items, the 16 TLC items were summed and divided by the total number of items to match qualitative anchors on the Likert scale. *Higher* scores indicated *greater* participant increased TLC use (beyond baseline) during the one-week period following completion of the intervention. Items were in response to the stem "*Using the scale provided, please indicate the extent to which, during the past week, you have actually increased your use of each of the following activities"* (see Appendix I).

Table 7.

Means and Standard Deviations of Post-Use Items

Items	*Mean*	*SD*
1. Spent at least 30 minutes every day being outdoors	4.45	1.59
2. Spent at least 30 minutes every day viewing nature	3.89	1.64
3. Slept 7-9 hours each night as a routine sleep schedule	3.96	1.54
4. Maintained good sleep hygiene nightly (e.g., screen time)	2.91	1.54
5. Engaged in moderate physical activity for 2.5 hours per week	4.10	1.68
6. Exercised in some way and broke a sweat for 2.5 hours per week	3.88	1.80
7. Maintained a well-balanced diet, eating everything in moderation	3.85	1.48
8. Ate in a healthy way, every day	3.73	1.51
9. Spent at least 30 minutes per day talking with others	5.14	1.38
10. Spent at least 30 minutes per day interacting with others	5.15	1.37
11. Spent time volunteering to be of help to others once per week	2.59	1.52
12. Spent time dedicated to serving others once per week	2.97	1.68
13. Utilized deep breathing, yoga, or meditation for 2-4 hours per week	2.36	1.50
14. Engaged in peaceful, quiet, or relaxing activities for 2-4 hours	3.45	1.61
15. Reflected on the personal meaning of your religion or spirituality	2.65	1.70
16. Sought out information about your religion or spirituality	2.30	1.59

Table 8.

Inter-correlations of Post-Use Items

Note. *Coefficients significant at $p < .05$. **Coefficients significant at $p < .01$. **Coefficients significant at $p < .001$.

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	-															
2.	.70**	-														
3.	.40**	.34**	-													
4.	.22**	.23**	.45**	-												
5.	.40**	.30**	.30**	.31**	-											
6.	.31**	.22**	.26**	.30**	.87**	-										
7.	.38**	.30**	.39**	.30**	.42**	.36**	-									
8.	.35**	.34**	.38**	.38**	.43**	.36**	.86**	-								
9.	.54**	.39**	.37**	.15*	.32**	.26**	.39**	.40**	-							
10.	.52**	.40**	.38**	.20**	.36**	.30**	.41**	.43**	.94**	-						
11.	.29**	.24**	.12	.21**	.28**	.24**	.22**	.22**	.17*	.18**	-					
12.	.27**	.20**	.19**	.34**	.29**	.24**	.24**	.23**	.24**	.25**	.75**	-				
13.	.30**	.29**	.25**	.39**	.32**	.31**	.36**	.41**	.12	.14	.34**	.29**	-			
14.	.36**	.35**	.30**	.26**	.27**	.24**	.34**	.36**	.33**	.34**	.25**	.25**	.52**	-		
15.	.12	.10	.10	.25**	.18**	.20**	.31**	.32**	.16*	.20**	.40**	.41**	.32**	.30**	-	
16.	.17*	.16**	.14*	.28**	.24**	.25**	.32**	.32**	.17*	.19**	.41**	.42**	.28**	.22**	.81**	-

Pre-Intervention Therapeutic Lifestyle Changes Self-Efficacy Expectations Assessment (Pre-SE) Descriptive Data

The means, standard deviations, and inter-correlations of all Pre-SE items are presented in Tables 9 and 10. After removing the dilution items, the 16 TLC items were summed and divided by the total number of items to match qualitative anchors on the Likert scale. *Higher* total scores indicated *greater* participant pre-intervention self-efficacy expectations for engaging in TLCs. Items were in response to the stem "*How confident are you in your ability to...during the next month?"* (see Appendix B).

Table 9.

Means and Standard Deviations of Pre-SE Items

Items	*Mean*	*SD*
1. Spend at least 30 minutes every day being outdoors	4.87	1.30
2. Spend at least 30 minutes every day viewing nature	4.20	1.52
3. Sleep 7-9 hours each night as a routine sleep schedule	3.77	1.53
4. Maintain good sleep hygiene nightly (e.g., screen time)	2.53	1.42
5. Engage in moderate physical activity for 2.5 hours per week	4.48	1.56
6. Exercise in some way and break a sweat for 2.5 hours per week	4.25	1.65
7. Maintain a well-balanced diet, eating everything in moderation	4.02	1.38
8. Eat in a healthy way, every day	3.75	1.44
9. Spend at least 30 minutes per day talking with others	5.54	0.92
10. Spend at least 30 minutes per day interacting with others	5.55	0.89
11. Spend time volunteering to be of help to others once per week	3.48	1.49
12. Spend time dedicated to serving others once per week	3.57	1.52
13. Utilize deep breathing, yoga, or meditation for 2-4 hours per week	2.64	1.50
14. Engage in peaceful, quiet, or relaxing activities for 2-4 hours	3.83	1.59
15. Reflect on the personal meaning of your religion or spirituality	3.25	1.81
16. Seek out information about your religion or spirituality	2.79	1.72

Table 10.

Inter-correlations of Pre-SE Items

Note. *Coefficients significant at $p < .05$. **Coefficients significant at $p < .01$. **Coefficients significant at $p < .001$.

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	-															
2.	.40**	-														
3.	.15**	.10*	-													
4.	.12*	.18**	.30**	-												
5.	.33**	.17**	.22**	.16**	-											
6.	.29**	.12**	.16**	.20**	.89**	-										
7.	.22**	.19**	.20**	.21**	.42**	.40**	-									
8.	.24**	.24**	.22**	.24**	.40**	.40**	.81**	-								
9.	.35**	.21**	.02	-.07	.15**	.14**	.11*	.09*	-							
10.	.34**	.19**	.04	-.07	.14**	.16**	.11**	.08	.80**	-						
11.	.24**	.26**	.06	.16**	.19**	.18**	.20**	.20**	.21**	.18**	-					
12.	.20**	.27**	.05	.23**	.21**	.17**	.19**	.19**	.17**	.14**	.66**	-				
13.	.13**	.31**	.07	.31**	.19**	.20**	.27**	.29**	.05	.02	.29**	.27**	-			
14.	.26**	.28**	.20**	.14**	.18**	.16**	.26**	.26**	.16**	.17**	.24**	.14**	.43**	-		
15.	.10*	.12*	.05	.15**	.16**	.14**	.20**	.20**	.06	.05	.29**	.28**	.30**	.15**	-	
16.	.08	.08	.03	.18**	.18**	.16**	.20**	.20**	.05	.06	.26**	.31**	.28**	.10*	.82**	-

Post-Intervention Therapeutic Lifestyle Changes Self-Efficacy Expectations Assessment (Post-SE) Descriptive Data

The means, standard deviations, and inter-correlations of all Post-SE items are presented in Tables 11 and 12. After removing the dilution items, the 16 TLC items were summed and divided by the total number of items to match qualitative anchors on the Likert scale. *Higher* total scores indicated *greater* participant post-intervention self-efficacy for engaging in TLCs. Items were in response to the stem "*How confident are you in your ability to...during the next month?"* (see Appendix B).

Table 11.

Means and Standard Deviations of Post-SE Items

Items	*Mean*	*SD*
1. Spend at least 30 minutes every day being outdoors	4.87	1.28
2. Spend at least 30 minutes every day viewing nature	4.37	1.43
3. Sleep 7-9 hours each night as a routine sleep schedule	4.22	1.48
4. Maintain good sleep hygiene nightly (e.g., screen time)	3.41	1.48
5. Engage in moderate physical activity for 2.5 hours per week	4.58	1.42
6. Exercise in some way and break a sweat for 2.5 hours per week	4.51	1.45
7. Maintain a well-balanced diet, eating everything in moderation	4.23	1.32
8. Eat in a healthy way, every day	4.31	1.28
9. Spend at least 30 minutes per day talking with others	5.32	1.09
10. Spend at least 30 minutes per day interacting with others	5.30	1.09
11. Spend time volunteering to be of help to others once per week	3.62	1.47
12. Spend time dedicated to serving others once per week	3.73	1.52
13. Utilize deep breathing, yoga, or meditation for 2-4 hours per week	3.18	1.60
14. Engage in peaceful, quiet, or relaxing activities for 2-4 hours	4.29	1.40
15. Reflect on the personal meaning of your religion or spirituality	3.34	1.80
16. Seek out information about your religion or spirituality	3.17	1.79

Table 12.

Inter-correlations of Post-SE Items

Note. *Coefficients significant at $p < .05$. **Coefficients significant at $p < .01$. **Coefficients significant at $p < .001$.

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	-															
2.	.52**	-														
3.	.28**	.22**	-													
4.	.25**	.24**	.41**	-												
5.	.40**	.18**	.33**	.34**	-											
6.	.35**	.18**	.30**	.36**	.84**	-										
7.	.26**	.28**	.39**	.40**	.42**	.42**	-									
8.	.27**	.23**	.37**	.37**	.38**	.42**	.83**	-								
9.	.49**	.32**	.18**	.13**	.25**	.18**	.22**	.18**	-							
10.	.40**	.25**	.17**	.09	.22**	.17**	.18**	.19**	.80**	-						
11.	.29**	.31**	.17**	.33**	.26**	.25**	.30**	.28**	.21**	.22**	-					
12.	.27**	.33**	.21**	.34**	.25**	.24**	.25**	.23**	.21**	.21**	.78**	-				
13.	.21**	.27**	.22**	.42**	.29**	.27**	.35**	.34**	.09*	.04	.37**	.35**	-			
14.	.36**	.36**	.27**	.31**	.28**	.27**	.36**	.36**	.32**	.24**	.29**	.31**	.46**	-		
15.	.14**	.24**	.11*	.26**	.21**	.21**	.27**	.28**	.07	.04	.37**	.32**	.36**	.25**	-	
16.	.16**	.24**	.10*	.30**	.20**	.21**	.26**	.28**	.06	.03	.38**	.36**	.45**	.27**	.82**	-

Mental Health Locus of Control Assessment (MHLOC) Descriptive Data

The means, standard deviations, and inter-correlations of the MHLOC Internality subscale items are presented in Tables 13 and 14. The 6 items of the Mental Health Locus of Control Internality subscale, were summed for a total score and divided by the number of items on the instrument subscale to match qualitative anchors on the Likert scale. *Higher* total scores indicated *greater* participant belief in their mental health being controlled by internal forces. Items were in response to the stem: "*Using the scale provided, please rate the extent to which you agree with each statement"* (see Appendix D).

Table 13.

Means and Standard Deviations of MHLOC Items

Items	*Mean*	*SD*
1. It is my own behavior that determines how soon I get well	3.84	1.37
2. I am in control of my own mental health	4.03	1.41
3. When my mental health is not good, I am to blame	3.00	1.46
4. Main thing that affects my mental health is what I do for myself	4.00	1.44
5. If I take care of myself, I can avoid mental health problems	3.95	1.49
6. If I take the right actions, I can stay mentally healthy	4.19	1.47

Table 14.

Inter-correlations of MHLOC Items

Note. *Coefficients significant at $p < .05$. **Coefficients significant at $p < .01$.

Items	1	2	3	4	5	6
1.	-					
2.	.33**	-				
3.	.29**	.24**	-			
4.	.41**	.40**	.36**	-		
5.	.41**	.55**	.43**	.56**	-	
6.	.38**	.46**	.28**	.50**	.63**	-

Therapeutic Lifestyle Changes Outcome Expectations Assessment (OE) Descriptive Data

The means, standard deviations, and inter-correlations of all OE items are presented in Tables 15 and 16. After removing the dilution items, the 16 TLC items were summed and divided by the total number of items to match qualitative anchors on the Likert scale. *Higher* total scores indicated *greater* participant expectations that their mental health will improve if they engage in TLCs. Items were in response to the stem "*Using the scale provided, please rate the degree of likelihood that your mental health will actually improve if you undertake each of the following activities"* (see Appendix E).

Table 15.

Means and Standard Deviations of OE Items

Items	*Mean*	*SD*
1. Spend at least 30 minutes every day being outdoors	5.02	1.16
2. Spend at least 30 minutes every day viewing nature	4.22	1.49
3. Sleep 7-9 hours each night as a routine sleep schedule	5.22	1.15
4. Maintain good sleep hygiene nightly (e.g., screen time)	4.51	1.40
5. Engage in moderate physical activity for 2.5 hours per week	5.23	1.04
6. Exercise in some way and break a sweat for 2.5 hours per week	5.13	1.18
7. Maintain a well-balanced diet, eating everything in moderation	5.11	1.12
8. Eat in a healthy way, every day	4.98	1.20
9. Spend at least 30 minutes per day talking with others	5.22	1.11
10. Spend at least 30 minutes per day interacting with others	5.24	1.10
11. Spend time volunteering to be of help to others once per week	4.58	1.30
12. Spend time dedicated to serving others once per week	4.57	1.38
13. Utilize deep breathing, yoga, or meditation for 2-4 hours per week	4.36	1.52
14. Engage in peaceful, quiet, or relaxing activities for 2-4 hours	4.89	1.24
15. Reflect on the personal meaning of your religion or spirituality	3.83	1.82
16. Seek out information about your religion or spirituality	3.61	1.79

Table 16.

Inter-correlations of OE Items

Note. *Coefficients significant at $p < .05$. **Coefficients significant at $p < .01$. **Coefficients significant at $p < .001$.

Items	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.	-															
2.	.51**	-														
3.	.49**	.29**	-													
4.	.43**	.36**	.53**	-												
5.	.52**	.28**	.53**	.49**	-											
6.	.48**	.29**	.51**	.48**	.79**	-										
7.	.46**	.29**	.52**	.50**	.62**	.60**	-									
8.	.42**	.30**	.48**	.50**	.59**	.53**	.76**	-								
9.	.46**	.37**	.37**	.34**	.43**	.40**	.38**	.39**	-							
10.	.45**	.37**	.36**	.33**	.43**	.42**	.38**	.38**	.87**	-						
11.	.42**	.35**	.28**	.30**	.38**	.35**	.36**	.35**	.44**	.44**	-					
12.	.34**	.32**	.19**	.32**	.32**	.31**	.34**	.35**	.38**	.39**	.73**	-				
13.	.33**	.33**	.37**	.48**	.44**	.43**	.44**	.38**	.34**	.30**	.37**	.32**	-			
14.	.49**	.40**	.43**	.40**	.47**	.47**	.51**	.48**	.47**	.44**	.45**	.39**	.58**	-		
15.	.25**	.31**	.13**	.17**	.20**	.20**	.21**	.20**	.26**	.22**	.39**	.41**	.27**	.29**	-	
16.	.21**	.31**	.13**	.16**	.17**	.18**	.18**	.19**	.23**	.20**	.38**	.39**	.28**	.25**	.89**	-

Therapeutic Lifestyle Changes Preference Descriptive Data

Participants rank ordered 32 behaviors (16 TLC items and 16 dilution items) in order to indicate those TLC activities they would most prefer to engage in to positively foster their mental health. Participants ranked the 32 behaviors from most to least preferred. I examined the most frequently chosen behaviors for each of the preference spots (see Table 17).

Strong caution is warranted in drawing conclusions from this data given that many participants did not appear to significantly adjust the behaviors presented to them from the starting positions, and therefore data may not accurately reflect overall participant preferences. Of the 448 participants who completed this measure, 7.6% adjusted less than 50% of the behaviors.

Table 17.

Rank Ordered Behavior Engagement Preferences

Preference	*Mode (Frequency)*
3	Spend at least 30 minutes every day being outdoors (91)
4	Spend at least 30 minutes every day viewing nature (45)
6	Maintain good sleep hygiene nightly (51)
7	Engage in moderate physical activity for 2.5 hours per week (53)
8	Exercise in some way and break a sweat for 2.5 hours per week (53)
11	Maintain a well-balanced diet, eating everything in moderation (43)
12	Eat in a healthy way, every day (56)
13	Spend at least 30 minutes per day talking with friends (52)
14	Spend at least 30 minutes per day interacting with others (55)
15	Spend time volunteering to be of help to others once per week (59)
16	Spend time dedicated to serving others once per week (64)
19	Utilize deep breathing, yoga, or meditation techniques for 2-4 hours (47)
20	Engage in peaceful, quiet, or relaxing activities for 2-4 hours (53)
21	Reflect on the meaning of your religion/spirituality once per week (53)
22	Seek out information about your religion/spirituality once per week (57)
27	Enjoy engaging in a personal hobby at least 2 hours per week (67)

Table 18.

TLC Item Endorsement Frequency in the Top 16 Rank Order Slots

*n = 413

TLC Item	*Frequency Represented in Top 50%*
Spend at least 30 minutes every day being outdoors	369
Spend at least 30 minutes every day viewing nature	365
Sleep 7-9 hours each night as a routine sleep schedule	359
Maintain good sleep hygiene nightly	347
Engage in moderate physical activity for 2.5 hours per week	337
Exercise in some way and break a sweat for 2.5 hours per week	332
Maintain a well-balanced diet, eating everything in moderation	282
Eat in a healthy way, every day	297
Spend at least 30 minutes per day talking with friends	276
Spend at least 30 minutes per day interacting with others	267
Spend time volunteering to be of help to others once per week	254
Spend time dedicated to serving others once per week	223
Utilize deep breathing, yoga, or meditation techniques for 2-4 hours	143
Engage in peaceful, quiet, or relaxing activities for 2-4 hours	123
Reflect on the meaning of your religion/spirituality once per week	123
Seek out information about your religion/spirituality once per week	83

Intervention Effect Analyses

Pilot Study Manipulation Check

The 81 pilot study cases utilized for analysis were approximately equally distributed between the two intervention conditions, with 43 participants in the Control condition and 38 participants in the TLC condition. A one-way analysis of variance (ANOVA) was conducted as a manipulation check on the item asking participants to rate the extent to which the presentation they had viewed increased their confidence to successfully engage in the eight TLCs. Contrary to expectations, the participants in the TLC condition (M = 4.61, SD = 1.24) did not endorse a statistically significantly higher level of perceived confidence than did participants in the Control

condition (M = 4.63, SD = 1.46), F (1, 79) = .006, p > .05, n^2 < .001. Overall, participants considered both interventions to "somewhat" to "moderately" increase their confidence to successfully engage in TLCs.

Despite these findings, I used both intervention conditions in the main study so that my initial intervention comparison hypotheses could be tested. However, because no manipulation item to assess perceived differential enhancement of self-efficacy expectations between intervention conditions was included in the materials in the main study (as was done in the pilot study), a determination of a group difference on self-efficacy expectation enhancement, dependent upon stimulus video viewed, could not be conducted in the main study. Therefore, based on the findings of the pilot study showing equal effect of the interventions on participant levels of self-efficacy expectations, I pooled all data from both intervention conditions for the main study and follow-up analyses. This pooling of data brought the variable of post-intervention self-efficacy expectations as the foundational starting point for all study analyses.

Self-Efficacy Expectations X Intervention (Hypotheses One and Two)

I utilized a paired samples t-test to address my first research question, regarding the ability of the TLC intervention to increase participants' self-efficacy to engage in TLCs. For the 227 participants who were assigned to the TLC condition, there was a statistically significant increase from their pre-intervention self-efficacy expectations scores (M = 3.89, SD = .71) to their post-intervention self-efficacy expectations scores (M = 4.23, SD = .79), t (226) = -10.16, p < .001. I also found a statistically significant increase in the 232 Control participants' pre-intervention self-efficacy expectations scores (M = 3.93, SD = .80) compared to their post-intervention self-efficacy expectations scores (M = 4.08, SD = .87), t (231) = -5.20, p < .001. The

mean difference found between pre- and post-intervention self-efficacy to engage in TLCs was of a slightly greater magnitude for participants in the TLC condition.

To test my second hypothesis in which I predicted the TLC intervention would increase participants' self-efficacy expectations to engage in TLCs to a significantly greater extent than would the Control intervention, I conducted a one-way analysis of covariance (ANCOVA) with intervention condition as my independent variable, post-intervention self-efficacy expectations as my dependent variable, and pre-intervention self-efficacy expectations as my covariate. I found a statistically significant difference between the adjusted mean post-intervention self-efficacy expectations of participants in the TLC condition (M = 4.23, SD = 0.79) versus Control condition (M = 4.08, SD = 0.87), F (1, 456) = 19.50, p <.001, n^2 = 0.041. Despite being statistically significant, the magnitude of the mean difference (.15) between my intervention conditions on self-efficacy to engage in TLCs does not reflect a meaningful attitudinal difference among participants across the two conditions.

Post-Intervention Follow-Up Use X Intervention

To address my third hypothesis, that participants in the TLC intervention would demonstrate statistically greater post-intervention actual TLC use at one-week follow-up than participants in the Control intervention, I conducted an ANCOVA, with intervention condition as my independent variable, post-intervention actual TLC use at one-week follow-up as my dependent variable, and pre-intervention TLC use as my covariate. I found no statistically significant difference between the adjusted mean post-intervention actual TLC use at one-week follow-up of participants in the TLC condition (M = 3.62, SD = 0.97) versus the Control condition (M = 3.55, SD = 0.92), F (1, 208) = 1.32, p > .05, n^2 = 0.006.

Moderation and Mediation Analyses

To investigate hypotheses 4 through 9, moderation and mediation analyses were conducted utilizing the Hayes Process Macro for SPSS (Hayes, 2013). Standardized residual variables were created for post-intervention TLC self-efficacy expectations, post-intervention intent to increase use of TLCs beyond baseline use, and post-intervention actual TLC use at one-week follow-up in order to account for pre-intervention self-efficacy expectations and pre-intervention TLC baseline use. I determined that this would lead to the most accurate moderation and mediation analyses, as covariates placed in Hayes Process Macro analysis procedures are accounted for in variables beyond the identified specific dependent variable (D. Russell, personal communication, January 31, 2018).

Mediation (Hypotheses Four and Seven)

To assess my fourth hypothesis, I examined outcome expectations as a possible mediator of the effect of post-intervention TLC self-efficacy expectations on post-intervention intent to increase TLC use beyond baseline use (see Figure 1). I found outcome expectations partially mediated the direct relation between post-intervention TLC self-efficacy expectations and intent to increase TLC use. Self-efficacy expectations had a direct effect on intent to increase TLC use (c' = .45). Outcome expectations (*ab* = .14) had an indirect effect on the relation between self-efficacy expectations and intent to increase TLC use, as demonstrated by a bias-corrected 95% bootstrap confidence interval for the indirect effect (based on 1,000 bootstrap samples) that did not include zero (.0975 to .1830). See Table 17 for results.

Table 19.

Mediation Effect of OE on the Relation Between Post-SE and Intent

Note. *Coefficients significant at $p < .05$. ** Coefficients significant $p < .01$. *** Coefficients significant $p < .001$.

Path	*b*	SE *b*	t	CI	R^2	F(df)
a) Post-SE -> OE	.36	.04	10.06***	.29, .43	.18	101.29*** (1, 457)
b) Post-SE -> Intent	.59	.04	15.46***	.51, .66	.34	238.95*** (1, 457)
c') Post-SE ->					.43	170.66***
OE ->	.38	.05	8.22***	.29, .47		(2, 456)
Intent	.45	.04	11.47***	.37, .53		

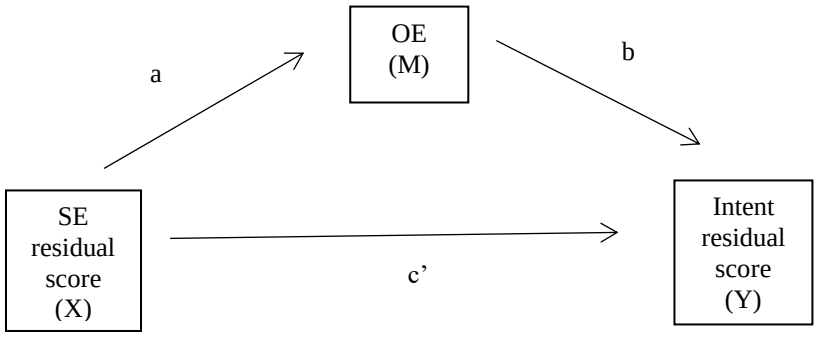

Figure 1. Mediation Model of Outcome Expectations on Relation Between Post-Intervention Self-Efficacy Expectations and Intent to Increase TLC Use

To address my seventh hypothesis, I examined outcome expectations as a possible mediator of the effect of post-intervention self-efficacy expectations on follow-up TLC use (see Figure 2).

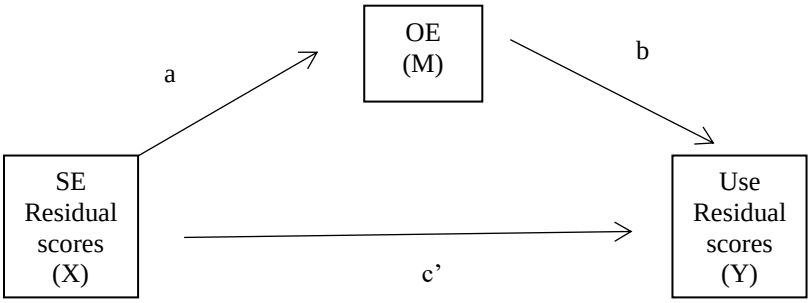

Figure 2. Mediation Model of Outcome Expectations on Relation Between Post-Intervention Self-Efficacy Expectations and Post-Intervention Follow-Up TLC Use.

I found that outcome expectations were not a mediator of the relation between post-intervention TLC self-efficacy expectations and post-intervention actual TLC use at one-week follow-up. Although post-intervention TLC self-efficacy expectations was found to be a significant predictor of outcome expectations (*a* = .32) and post-intervention actual TLC use at one-week follow-up (*c'* = .34), outcome expectations were not found to significantly indirectly affect the direct relation of post-intervention self-efficacy expectations and post-intervention actual TLC use at one-week follow-up (*b* = .05).

A bias-corrected 95% bootstrap confidence interval for the indirect effect (*ab* = .02) based on 1,000 bootstrap samples included zero (-.0333 to .0665). See Table 18 for results.

Table 20.

Mediation Effect of OE on the Relation Between Post-SE and Post-Intervention Use

Note. *Coefficients significant at $p < .05$. ** Coefficients significant $p < .01$. *** Coefficients significant $p < .001$.

Path	*b*	SE *b*	t	CI	R^2	F(df)
a) Post-SE -> OE	.32	.06	5.25***	.20, .43	.12	27.60*** (1, 209)
b) Post-SE -> Use	.36	.07	5.04***	.22, .50	.11	25.42*** (1, 209)
c') Post-SE ->					.11	12.90***
OE ->	.05	.08	.68	-.11, .22		(2, 208)
Use	.34	.08	4.50	.19, .49		

Moderation (Hypotheses Five, Six, Eight, and Nine)

To address my fifth and sixth hypotheses, predicting that mental health locus of control would moderate the relation between post-intervention TLC self-efficacy expectations and outcome expectations as well as the relation between outcome expectations and post-intervention intent to increase TLC use respectively, two separate moderation analyses were conducted. Results for both moderation analyses demonstrated that mental health locus of control did not act as a moderator. See Tables 19 and 20 for results.

Table 21.

Moderation Effects of MHLOC on the Relation Between Post-SE and OE

Note. * Coefficients significant at $p < .05$. ***Coefficients significant at $p < .001$.

	b	SE *b*	t	CI	R^2	F(df)
MHLOC	-.00	.04	-.12	-.08, .07		
SE	.58	.04	15.29***	.51, .66		
MHLOCxSE	-.03	.04	-.76 ($p = .45$)	-.10, .05		
Model Summary					.34 $\Delta R^2 = .00$	79.60*** (3, 455)

Table 22.

Moderation Effects of MHLOC on the Relation Between OE and Intent

Note. * Coefficients significant at $p < .05$. ***Coefficients significant at $p < .001$.

	b	SE *b*	t	CI	R^2	F(df)
MHLOC	-.08	.04	-1.99*	-.16, .00		
OE	.63	.05	12.81***	.53, .73		
MHLOCxOE	.01	.04	.31 ($p = .75$)	-.07, .10		
Model Summary					.27 $\Delta R^2 = .00$	55.97*** (3, 455)

To address my eighth and ninth hypotheses, predicting that mental health locus of control would moderate the relation between outcome expectations and post-intervention actual TLC use at one-week follow-up, and intent would moderate the relation between post-intervention TLC self-efficacy expectations and post-intervention actual TLC use at one-week follow-up, two separate moderation analyses were conducted. I found that neither mental health locus of control

nor post-intervention intent to increase TLC use acted as moderators in these respective analyses. See Tables 21 and 22 for results.

Table 23.

Moderation Effects of MHLOC on the Relation Between OE and Post-Intervention Use

Note. * Coefficients significant at $p < .05$. ***Coefficients significant at $p < .001$.

	b	SE *b*	t	CI	R^2	F(df)
MHLOC	.02	.07	.22	-.12, .16		
OE	.18	.08	2.10*	.01, .34		
MHLOCxOE	.02	.08	.24 ($p = .81$)	-.14, .18		
Model Summary					.02 $\Delta R^2 = .00$	1.70 (3, 207)

Table 24.

Moderation Effects of Intent on the Relation Between Post-SE and Post-Intervention Use

Note. * Coefficients significant at $p < .05$. ***Coefficients significant at $p < .001$.

	b	SE *b*	t	CI	R^2	F(df)
Intent	.08	.09	.97	-.09, .25		
Post-SE	.31	.09	3.70**	.15, .48		
IntentxPost-SE	-.07	.06	-1.16 ($p = .25$)	-.18, .05		
Model Summary					.12 $\Delta R^2 = .01$	9.36*** (3, 207)

Exploratory Regression Analyses

Given the largely non-significant findings for study hypotheses, I conducted exploratory regression analyses in order to gain a better understanding of the influence that key variables in this study had upon both post-intervention intent to increase TLC use and participants' post-

intervention actual TLC use at one-week follow up. Standardized residual variables were utilized in these analyses for all post-intervention variables to control for participant baseline levels.

In the first regression, post-intervention TLC self-efficacy expectations, outcome expectations, and mental health locus of control were regressed against the dependent variable of post-intervention intent to increase TLC use. A forward selection procedure was employed using a selection criterion of *p-in* < .05 to enter the equation and *p-out* < .10 to exit. Together, post-intervention TLC self-efficacy expectations, outcome expectations, and mental health locus of control accounted for 43% of the variance in post-intervention intent to increase TLC use (see Table 23). Important to note is the variance accounted for by mental health locus of control in the full model, above and beyond that already accounted for by post-intervention TLC self-efficacy expectations and outcome expectations, was negligible.

Table 25.

Exploratory Regression Analysis

Note. *Coefficients significant at $p < .05$. ** Coefficients significant $p < .01$. *** Coefficients significant $p < .001$.

Model	*b*	SE *b*	*β*	R^2	ΔR^2	ΔF (df)
1. SE Expectations	.59	.04	.59***	.34	.34	238.95*** (1, 457)
2. SE Expectations	.45	.04	.45***			
OE	.38	.05	.32***	.43	.09	67.57*** (1,456)
3. SE Expectations	.45	.04	.45***			
OE	.40	.05	.34***	.43	.01	4.00* (1, 455)
MHLOC	-.07	.04	-.07*			

In a second regression equation, post-intervention TLC self-efficacy, outcome expectations, mental health locus of control, and intent were regressed against the dependent variable of post-intervention actual TLC use at one-week follow-up. A forward selection

procedure was again employed using a selection criterion of *p-in* < .05 to enter the equation and *p-out* < .10 to exit. Only post-intervention TLC self-efficacy expectations met the entry criterion, accounting for 11% of the variance in participants' TLC use at one week follow up (see Table 24).

Table 26.

Regression Analysis of Post-SE, OE, MHLOC, Intent x Post-Intervention Follow-Up Use

Note. *Coefficients significant at $p < .05$. ** Coefficients significant $p < .01$. *** Coefficients significant $p < .001$.

Model	*b*	SE *b*	*β*	R^2	ΔR^2	ΔF (df)
1. Post-SE	.36	.07	.33	.11	.11	25.42*** (1, 209)

CHAPTER 5. DISCUSSION

Employing Social Cognitive Theory, the primary focus of my study concerned assessing the impact of a self-efficacy enhancing intervention (with an accompanying control condition), and examining the effect of this intervention on both participants' immediate intent to increase their use of TLC behaviors and actual increases in TLC behaviors at one-week post-intervention. Secondarily, I examined the potential mediating effect of outcome expectations as well as the potential moderating effect of participants' mental health locus of control, on both participants' immediate intent to increase their use of TLC behaviors and actual increases in TLC behaviors at one-week post-intervention. I also sought to obtain descriptive data on participants' current, intended, and actual use of TLC behaviors at one-week follow-up.

Therapeutic Lifestyle Changes Descriptive Data

Social interaction (spending at least 30 minutes per day talking with others and spending at least 30 minutes per day interacting with others), spending time with nature (spending at least 30 minutes every day being outdoors and spending at least 30 minutes every day viewing nature), physical activity (engaging in moderate physical activity for 2.5 hours per week and exercising in some way and breaking a sweat for 2.5 hours per week), and maintaining a stable sleep schedule (sleeping 7-9 hours each night), were the TLCs most highly endorsed by participants at baseline and post-intervention, as well as were the TLCs participants most intended to engage in to a greater extent.

However, these top four TLCs, although consistently endorsed across measurement points, showed no significant mean score increase at post-intervention one-week follow-up. Rather, the highest mean scores occurred at the point of intent to increase TLCs and declined at post-intervention actual TLC use at one-week follow up. Although participant intentions were

high to increase their use of TLC behaviors post-intervention, participants did not follow-through and execute those changes in behavior to the extent they were interested in doing so. The major impact of the interventions was obtained immediately after viewing, and in as little as one week, the impact on participants declined and the intervention conditions failed to bring about participants' reported desire to change their use of TLC behaviors.

Intervention Effects

My TLC intervention was designed to enhance participants' self-efficacy expectations regarding their ability to successfully increase TLC use, and it did so, albeit to a small degree. However, the Control intervention I employed also increased participants' self-efficacy expectations to engage in TLCs, to a somewhat smaller extent than my author-devised intervention. This was an unanticipated finding, as the content of the Control intervention did not focus specifically on the TLCs assessed in my study as my author-devised intervention did. I had hoped to discover that the TLC intervention I created would be able to discriminately increase participant self-efficacy expectations to engage in TLCs and post-intervention increased engagement in TLCs; however, that was not the case, with results suggesting that the TLC intervention was not majorly more successful than the Control intervention.

There was no statistically significant difference perceived by participants in their reported effect of the TLC intervention and the Control intervention to raise their confidence to engage in TLC behaviors. As well, the TLC intervention I created did not increase participants' actual TLC use at one week follow-up in a way that was statistically significantly different from participants in the Control condition. Finally, although post-intervention self-efficacy expectations were only slightly statistically significantly different from pre-intervention self-efficacy expectations, the

level of post-intervention enhancement of self-efficacy expectations that the two interventions engendered had a small magnitude relation to actual TLC behaviors at one-week follow up.

Mediation and Moderation Effects

As to the potential mediating effect of outcome expectations and potential moderating effect of participant mental health locus of control on participants' immediate intent to increase their use of TLC behaviors and actual increase in TLC behaviors at one-week post-intervention, only outcome expectations demonstrated a partial mediation effect on the direct relation between post-intervention levels of participant self-efficacy expectations and intent to increase use of TLC behaviors, indicating that outcome expectations had a meaningful effect on the extent to which levels of self-efficacy expectations were linked to the intent to adopt TLC behaviors.

Throughout the rest of this discussion, I will examine how my results both do and do not fit within the Social Cognitive Theory framework.

Social Cognitive Theory

TLC Preferences

Participant preferences for TLCs they would choose to increase their utilization of were requested to understand those TLC behaviors people may be more likely to engage in to benefit their mental health. Participants chose spending time with nature, sleep, physical activity, diet/nutrition, and social interaction as the behaviors in which they would most prefer to increase their engagement. These same TLC behaviors had the highest average mean scores in terms of self-efficacy expectations, outcome expectations, intent to increase use, and post-intervention follow-up utilization, which fits within the Social Cognitive Theory framework. People are most likely to be willing to expend the effort to engage in those activities which they feel confident

they can successfully achieve and which they believe will have an important and desired impact (Bandura, 1977; 1986).

Self-Efficacy Expectations

Pre-intervention self-efficacy expectation mean scores were relatively high for my sample, with the majority of TLC items rated at the "somewhat confident" to "largely confident" point on the qualitative anchors. The TLC behaviors rated highest at assessment of pre-intervention self-efficacy expectations were social interaction, spending time with nature, physical activity, and diet/nutrition, and the same as those rated highest at post-intervention assessment. Post-intervention self-efficacy expectations were only slightly statistically significantly different from pre-intervention self-efficacy expectations, potentially explained by the higher mean and range restriction in levels of pre-intervention self-efficacy expectations, permitting mostly low magnitude increases at post-intervention.

Participants' pre-intervention self-efficacy expectations, pre-intervention TLC use, intent to increase engagement in TLCs, post-intervention self-efficacy expectations, and post-intervention TLC use, were all strongly positively correlated. Regression analyses determined that post-intervention self-efficacy expectations, outcome expectations, and locus of control accounted for 43% of the variance in intent to increase TLC use beyond baseline use, with self-efficacy and outcome expectations accounting for the vast majority of that variance. Exploratory regression analysis determined that only post-intervention self-efficacy expectations were related to post-intervention TLC use at one-week follow-up, sharing a slim 11% of common variance. These findings are generally in line with the effects and relations of self-efficacy expectations suggested in Social Cognitive Theory (Bandura, 1977; 1986).

Outcome Expectations

TLC outcome expectations demonstrated the highest mean scores of all measures, rated almost exclusively in the "moderately likely" to "largely likely" categories. The TLCs most highly rated by participants as likely to benefit mental health included social interaction, physical activity, sleep, and diet/nutrition, and were mainly consistent with the TLCs most highly rated for pre- and post-intervention self-efficacy expectations, pre-intervention TLC use, post-intervention TLC use, and intent to increase use of. Interestingly, the items not highly ranked by participants as likely to benefit mental health (stress management/relaxation, being of service to others, and spirituality/religion) were also of lower mean score magnitude on self-efficacy expectations, intent to utilize, and actual utilization at one week follow up.

Participant mental health outcome expectations via engagement in TLCs were strongly positively correlated with intent to increase TLC use, pre-intervention self-efficacy expectations, and post-intervention self-efficacy expectations. Outcome expectations were moderately positively correlated with pre-intervention TLC use and post-intervention follow-up TLC use. Outcome expectations were also found to partially mediate the effect of post-intervention self-efficacy expectations on intent to increase TLC use, but not for post-intervention one-week follow-up TLC use.

These outcome expectations results are semi-consistent with the Social Cognitive Theory framework. Outcome expectations were found to influence intent, as well as were identified as a mediator of the role of self-efficacy expectations on intent to increase TLC use, demonstrating their importance. As well it fits that the TLCs most highly endorsed in the outcome expectations assessment, were also those rated highest in pre-use, intent, and post-use. If people believe that engaging in these TLCs will positively benefit mental health, they are more likely to engage in

these behaviors compared to those behaviors rated lower. However, based on Social Cognitive Theory, I had expected outcome expectations to exert a greater impact on participant post-intervention TLC use at one-week follow-up.

Locus of Control

Internal locus of control items were rated at the "somewhat agree" to the "moderately agree" qualitative anchors, suggesting participants had a small-to-moderate sense of internal locus of control regarding their own mental health. Mental health internal locus of control was found to be weakly correlated with all other variables, including pre-intervention and post-intervention TLC use, pre-intervention and post-intervention self-efficacy expectations, and mental health outcome expectations. Contrary to my predictions, mental health locus of control was not found to moderate the relations between self-efficacy expectations and outcome expectations, outcome expectations and intent to increase TLC use, nor the relation between outcome expectations and post-intervention TLC use at one-week follow-up. These results are counter to Social Cognitive Theory and some past research, which has demonstrated that individuals with a higher internal locus of control are more likely to take actions to better their life conditions (Gore & Rotter, 1963), individuals believing themselves to have more personal control over their health and health-promoting behaviors were more likely to engage in those behaviors and promote their health (Tsai et al., 2015), and college students with higher levels of internal locus of control demonstrated significantly greater health lifestyle scores (Long et al., 1988). This finding is also surprising as on average, participants had positive outcome expectations that engaging in TLCs would benefit mental health. So, participants believed that engaging in TLCs would benefit them, and they believed as a whole that they had the power to

determine their mental health, but this internal locus of control did not contribute to intent to increase TLC or post-intervention engagement in TLC use at one-week follow-up.

Past research focusing specifically on the role of locus of control on TLC use has yielded varied results, some of which are consistent with my results. For example, Speake and colleagues (1989) found that both higher internal and external health locus of control was associated with greater engagement in exercise and stress management. Studies examining the impact of internal versus external locus of control on exercise have shown equivocal results, with Cramer and colleagues (2014) finding that higher internal locus of control increased engagement in physical activity, while Laffrey and Isenberg (2003) demonstrated that internal health locus of control was not related to exercise engagement.

Additional explanations I have considered to explain my findings showing internal locus of control to have a lack of influence on TLC use, include the more social and external nature of many of the TLC behaviors, suggesting that an external locus of control may be more influential than internal. Additionally, my locus of control measure tapped control over individual general mental health, while the self-efficacy and outcome expectation measures were focused on levels of confidence in, and the utility of, executing TLCs, apparently variables that are less related than I had hypothesized. My results chiefly suggest that participants' general belief that they were (or were not) able to control their mental health had little to do with their confidence to increase their TLC behaviors, their perception of the outcomes on the use of TLCs to benefit mental health, their intent to increase TLC use, or their post-intervention TLC use at one-week follow-up.

Limitations

My study had limitations that are important to note. These limitations included a limited difference between the effect of the control and TLC intervention conditions on participant levels of self-efficacy expectations, the variable Likert scale item stems and anchors across instruments, and sample specific issues. Methodologically, I examined a full complement of eight TLCs; however, most research indicates behavior change is best seen in a single target focus. My use of multiple TLC targets may have made identifying *specific* change in any single TLC difficult. Also, statistically analyzing TLCs as separate items, or as parcels of fewer items (especially those with lower pre-intervention mean scores and greater room to increase use) may have shown more change in use across follow-up.

Intervention Conditions

My original goal of employing both a Control (non-TLC) and a TLC self-efficacy enhancing condition, was to examine differences in their impact on participant self-efficacy expectations, intentions to utilize TLCs, and actual post-intervention use of TLCs at one-week follow up. This was a desired goal, so as to identify the ability of a theory-based TLC intervention to be successful in achieving behavior change over that provided by a general skill-building intervention. Unfortunately, participants did not report a significant difference between the Control and the TLC intervention conditions in increased confidence to engage in TLC behaviors. Additionally, both conditions provided increased self-efficacy expectations across the duration of the study, with participants in the TLC condition exhibiting slightly higher levels self-efficacy expectations across all measurement points. Therefore, I could find no evidence that a Social Cognitive Theory-based intervention was more successful in achieving behavior change than a general intervention.

Follow-Up

For purposes of controlling attrition, I conducted my post-intervention TLC behavior use follow-up assessment one week after participants engaged in the intervention, perhaps not allowing for a significant amount of time for changes to occur, certainly likely not enough time for new habits to develop. This amount of time may also not have been sufficiently long enough to show the immediate beginnings of significant behavior change. Extant research on habit formation suggests that three weeks is needed for simple behavior changes (e.g., consuming more water), and longer amounts of time are needed for more complex behavior changes (Lally, van Jaarsveld, Potts, & Wardle, 2009). For example, Kaushal and Rhodes (2015), found that a minimum of 6 weeks was needed for exercise behavior change. Given findings concerning the typical time associated with the adoption of new simple and complex behaviors (weeks to months), a follow up conducted at one or two months may have shown different results.

Additionally, differences on Likert scale item stems and anchors across points of measurement using the TLC Use Assessment (e.g., prompt: "*in the past month, how much of the time have you…*"; Likert scale anchors: "*not at all*" to "*all (you do this weekly)*") and the One Week Follow-Up TLC Use instrument (e.g., prompt: *"using the scale provided, please indicate the extent to which, during this past week**,** you have actually increased your use of each of the following activities"*; Likert scale anchors: "not at all" to "a great amount"), I was unable to directly compare participants' use of TLC engagement from pre-to-post intervention within similar time frames and according to specific gradients of change. Also, my instruments did not assess specific, numerical frequency of TLC utilization, which may have been better able to detect slight increases in behavior change as compared with the more molar level descriptors used as Likert scale anchors. Last, I did not measure participants' perceptions of available "free

time" in which they could increase utilization of TLC behaviors such as getting more sleep, socializing more, or spending more time outdoors. As such, the degree to which participants thought they could realistically fit these new behaviors into their schedules may have been an important variable to assess.

Sample Issues

Although the focus of my study revolved around college students, my sample is still considered to be a convenience sample as my participants all came from the Department of Psychology research system; therefore, my findings may not be generalizable to community samples, or to college students from other geographic regions of the country or other majors.

Future Research

Investigators can improve upon as well as extend the scope of my study in future research. The benefits of TLC behaviors is an important area of research and should not be forgotten or overlooked. A specific way to improve upon my study would be for researchers to assess specific numerical frequency or quantity of engagement in TLC behaviors, and use this more precise tracking of behavioral events across time. In addition to the benefits I already highlighted that such a methodological approach could provide, this information could provide additional insight into self-efficacy expectations and whether participants are continuously building their self-efficacy by successfully engaging in TLC behaviors. As well, avoiding a pure reliance on participant self-report of TLC use and requiring participants to record their daily TLC use or utilize a digital monitoring system could provide more accurate and specific results. This method may also help remind participants to engage in the TLC behaviors and help to reinforce them for doing so. Additionally, examining and accounting for barriers to increased TLC use

(e.g., time, actual effort or environmental changes required to effectively change behavior, knowledge of how to build new and sustainable habits) could help to determine components that have significant effects on the successful adoption or increased usage of TLC behaviors and be incorporated into future interventions. Incorporating such a variable into a future study may also better elucidate the influence of locus of control on engagement in TLC behaviors.

In examining how Social Cognitive Theory can serve as a framework for research investigating the enhanced use of TLC behaviors, a closer examination of outcome expectations and locus of control are in order. Although Social Cognitive Theory does not directly include locus of control as a component, and specifically does not include mental health locus of control, the issue of control over outcomes is intricately intertwined with the main premises of Social Cognitive Theory (Schwarzer & Fuchs, 1995). Possibly, assessing participants' locus of control concerning their physical health or for engaging in TLCs instead of their mental health may lead to different results in terms of this variable affecting TLC behavior use as predicted by Social Cognitive Theory self-efficacy and outcome expectations.

Another path for investigators would be to employ a dismantling method in order to identify the specific components of a Social Cognitive Theory-based TLC intervention to increase self-efficacy expectations and TLC utilization. Social Cognitive Theory identifies four methods through which to build self-efficacy expectations: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal (Bandura, 1977), all of which I attempted to include in my devised TLC intervention. However, it would be helpful to understand how these individual elements affected self-efficacy expectations, so as to make interventions as potent as possible. A dismantling study would call for presenting self-efficacy enhancing interventions that possess all four efficacy building methods, only one of the four

methods, as well as an array of intermediate interventions that have unique permutations of the four methods, to determine the most potent and necessary elements to maximize behavioral change outcomes.

Implications for Practice

The difference in participant reports surrounding intention to increase TLC use and actual increased use of TLC behaviors is a key finding related to clinical or applied practice. Post-intervention, participant intent to increase use of TLCs was strong but not consistent on follow-up assessment of actual increased use. Although I have hypothesized that factors not measured in my study likely have affected this finding, the reality is that the finding is pertinent to clinicians seeking to assist clientele in behavior change and habit formation. My findings suggest that more attention needs to be paid to helping individuals follow-through on their intentions after an intervention takes place to encourage and instill behavior change and better understand barriers that may obstruct participants from reaching their intended goals. One immediate factor of importance may be setting a specific goal for increased TLC use, a variable not included in my study. Further, goal setting needs to be aligned with various time frames post intervention (gradual improvement at various points in time) in order for a chain of performance accomplishments and reinforcement to occur and for clients to persist in their longer-term goal efforts. Past research and the Theory of Planned Behavior, has demonstrated that although attitudes and intentions *predict* behaviors, intent is often stronger than actual behavior change (Ajzen, 1985; Ajzen & Fishbein, 1980; Ajzen, Brown, & Carvajal, 2004; Sheeran, 2002). Additionally, perhaps follow-up interactions, reminders, and trouble-shooting opportunities would help to reduce the gap between intent and behavior change.

No statistical differences were found by sex or by race/ethnicity on intent to increase use of TLCs or on post-intervention TLC use. Therefore, no immediate evidence is available to assert that TLC-focused interventions are not validly used with different racial/ethnic groups. However, my sample size of racially diverse students was small so a better examination of this variable is needed to provide clinicians with confidence that the employment of Social Cognitive Theory tenets are universal.

Additionally, the impact that personalizing the intervention to each individual has on self-efficacy expectations and TLC engagement would be important to examine. For example, how the incorporation of one-on-one coaching, opportunities for feedback or troubleshooting, and client accountability impact successful use of TLC behaviors. Such examination should integrate an assessment of how various cultural or other factors might influence TLC use and diversify needs from an intervention standpoint. The balance between the ease and applicability of an etic approach to clinical interventions and the effective specificity of emic approaches, is always an important consideration. The creation of successful TLC interventions, with potent elements, that is adaptive and sensitive to diverse clientele will be most effective.

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APPENDIX A. TLC USE ASSESSMENT

Pre-Intervention

Instructions: *In the past month*, how much of the time have you…

1	2	3	4	5	6
Not at all	Rarely (less than 1 week in the past month)	A little (1 week of the past month)	Some (2 weeks of the past month)	Most (3 weeks of the past month)	All (you do this weekly)

…spent at least 2 hours per week learning about international news issues?

…watched the nightly news or read a daily newspaper at least 2 hours per week?

…spent at least 30 minutes every day being outdoors?

…spent at least 30 minutes every day viewing nature through a window or pictures of nature?

…slept 7-9 hours each night as a routine sleep schedule?

…maintained good sleep hygiene nightly (e.g., no screen time 30 minutes prior to bed)?

…engaged in moderate physical activity for at least 2.5 hours per week?

…exercised in some way and broke a sweat for at least 2.5 hours per week?

…played on a club or intramural sports team at least once a week?

…attended a club meeting or activity at least once a week?

…maintained a well-balanced diet, eating everything in moderation on a daily basis?

…eaten in a healthy way, every day, without consuming too much of any one kind of food?

…spent at least 30 minutes per day talking with others?

…spent at least 30 minutes per day interacting with others?

…spent time volunteering to be of help to others at least once a week?

…spent time dedicated to serving others, in some way at least once a week?

…spent time cleaning your living space for at least 1 hour per week?

…spent time putting away and organizing your belongings for at least 1 hour per week?

…utilized deep breathing, yoga, or meditation techniques for 2-4 hours per week?

…engaged in peaceful, quiet, or relaxing activities for 2-4 hours per week?

…reflected on the personal meaning of your religion or spirituality at least once a week?

…sought out some information about your religion or spirituality at least once a week?

…cooked meals for yourself at least three times a week?

…fixed your own lunch to take to school or work at least three times a week?

…read for pleasure (non-school material) at least 2 hours per week?

…surfed the web (for non-school related activities) at least 2 hours per week?

…enjoyed engaging in a personal hobby at least 2 hours per week?

…attended or participated in a fun activity for at least 2 hours per week?

…tried to interact face-to-face with a new friend or acquaintance once a week?

…tried to talk with someone you didn't know at least once a week?

…spent at least two hours per week learning a new skill?

…spent at least two hours per week picking up a new hobby or organized activity?

Post-Intervention

Instructions: To what degree do you *intend* to…

1	2	3	4	5	6
Not at all	Rarely (less than 1 week in the past month)	A little (1 week of the past month)	Some (2 weeks of the past month)	Most (3 weeks of the past month)	All (you do this weekly)

…spend at least 2 hours per week learning about international news issues, *during the next month*?

…watch the nightly news or read a daily newspaper at least 2 hours per week, *during the next month*?

…spend at least 30 minutes every day being outdoors, *during the next month*?

…spend at least 30 minutes every day viewing nature through a window or pictures of nature, *during the next month*?

…sleep 7-9 hours each night as a routine sleep schedule, *during the next month*?

…maintain good sleep hygiene nightly (e.g., no screen time 30 minutes prior to bed), *during the next month*?

…engage in moderate physical activity for at least 2.5 hours per week, *during the next month*?

…exercise in some way and break a sweat for at least 2.5 hours per week, *during the next month*?

…play on a club or intramural sports team at least once a week, *during the next month*?

…attend a club meeting or activity at least once a week, *during the next month*?

…maintain a well-balanced diet, eating everything in moderation on a daily basis, *during the next month*?

…eat in a healthy way, every day, without consuming too much of any one kind of food, *during the next month*?

…spend at least 30 minutes per day talking with others, *during the next month*?

…spend at least 30 minutes per day interacting with others, *during the next month*?

…spend time volunteering to be of help to others at least once a week, *during the next month*?

…spend time dedicated to serving others, in some way, at least once a week, *during the next month*?

…spend time cleaning your living space for at least 1 hour per week, *during the next month*?

…spend time putting away and organizing your belongings for at least 1 hour per week, *during the next month*?

…utilize deep breathing, yoga, or meditation techniques for 2-4 hours per week, *during the next month*?

…engage in peaceful, quiet, or relaxing activities for 2-4 hours per week, *during the next month*?

…reflect on the personal meaning of your religion or spirituality at least once a week, *during the next month*?

…seek out some information about your religion or spirituality at least once a week, *during the next month*?

…cook meals for yourself at least three times a week, *during the next month*?

…fix your own lunch to take to school or work at least three times a week, *during the next month*?

…read for pleasure (non-school material) at least 2 hours per week, *during the next month*?

…surf the web (for non-school related activities) at least 2 hours per week, *during the next month*?

…enjoy engaging in a personal hobby at least 2 hours per week, *during the next month*?

…attend or participated in a fun activity for at least 2 hours per week, *during the next month*?

…try to interact face-to-face with a new friend or acquaintance once a week, *during the next month*?

…try to talk with someone you don't know at least once a week, *during the next month*?

…spend at least two hours per week learning a new skill, *during the next month*?

…spend at least two hours per week picking up a new hobby or organized activity, *during the next month*?

APPENDIX B. TLC SELF-EFFICACY ASSESSMENT

Instructions: How confident are you in your ability to...

1	2	3	4	5	6
Not at all confident	Slightly confident	Somewhat confident	Moderately confident	Largely confident	Totally confident

…spend at least 2 hours per week learning about international news issues, *during the next month*?

…watch the nightly news or read a daily newspaper at least 2 hours per week, *during the next month*?

…spend at least 30 minutes every day being outdoors, *during the next month*?

…spend at least 30 minutes every day viewing nature through a window or pictures of nature, *during the next month*?

…sleep 7-9 hours each night as a routine sleep schedule, *during the next month*?

…maintain good sleep hygiene nightly (e.g., no screen time 30 minutes prior to bed), *during the next month*?

…engage in moderate physical activity for at least 2.5 hours per week, *during the next month*?

…exercise in some way and break a sweat for at least 2.5 hours per week, *during the next month*?

…play on a club or intramural sports team at least once a week, *during the next month*?

…attend a club meeting or activity at least once a week, *during the next month*?

…maintain a well-balanced diet, eating everything in moderation on a daily basis, *during the next month*?

…eat in a healthy way, every day, without consuming too much of any one kind of food, *during the next month*?

…spend at least 30 minutes per day talking with others, *during the next month*?

…spend at least 30 minutes per day interacting with others, *during the next month*?

…spend time volunteering to be of help to others at least once a week, *during the next month*?

…spend time dedicated to serving others, in some way, at least once a week, *during the next month*?

…spend time cleaning your living space for at least 1 hour per week, *during the next month*?

…spend time putting away and organizing your belongings for at least 1 hour per week, *during the next month*?

…utilize deep breathing, yoga, or meditation techniques for 2-4 hours per week, *during the next month*?

…engage in peaceful, quiet, or relaxing activities for 2-4 hours per week, *during the next month*?

…reflect on the personal meaning of your religion or spirituality at least once a week, *during the next month*?

…seek out some information about your religion or spirituality at least once a week, *during the next month*?

…cook meals for yourself at least three times a week, *during the next month*?

…fix your own lunch to take to school or work at least three times a week, *during the next month*?

…read for pleasure (non-school material) at least 2 hours per week, *during the next month*?

…surf the web (for non-school related activities) at least 2 hours per week, *during the next month*?

…enjoy engaging in a personal hobby at least 2 hours per week, *during the next month*?

…attend or participated in a fun activity for at least 2 hours per week, *during the next month*?

…try to interact face-to-face with a new friend or acquaintance once a week, *during the next month*?

…try to talk with someone you don't know at least once a week, *during the next month*?

…spend at least two hours per week learning a new skill, *during the next month*?

…spend at least two hours per week picking up a new hobby or organized activity, *during the next month*?

APPENDIX C. INTERVENTIONS

Control Intervention

Instructions: You will now view a presentation informing you of simple lifestyle changes that you can choose to incorporate into your life to improve your mental health. Following the presentation, you will be asked to engage in some brief reflection and writing about what you have learned.

There will be an important audio component to this presentation, so please make sure that you have the volume on your computer turned to an appropriate level.

YouTube Video: https://www.youtube.com/watch?v=N4YVLkuRBe8

Item 1: Please briefly reflect on and write about what you learned from this presentation.

Item 2: Take a few moments to imagine that you have reached a place in your life where you become regularly able to engage in good time management strategies. Reflect on what it would feel like and mean to you to be able to accomplish such a thing. Consider the positive feelings about yourself that you would experience by enhancing your mental health; by pushing through the initial challenge of building new habits to regularly practice time management strategies; to have more energy; and, to have a greater capacity to effectively cope with school, work, and life demands. Also, if you have been able to already regularly successfully incorporate time management strategies into your life, reflect on how you felt about yourself by being able to do so. Please write below about what you have reflected on.

TLC Self-Efficacy Intervention

Instructions: You will now view a presentation informing you of simple lifestyle changes that you can choose to incorporate into your life to improve your mental health. Following the presentation, you will be asked to engage in some brief reflection and writing about what you have learned.

There will be an important audio component to this presentation, so please make sure that you have the volume on your computer turned to an appropriate level.

Intervention Script

Introduction

- Hello, and welcome. My name is Kate Florer, and I am a doctoral candidate in Counseling Psychology. I hold a master's degree in psychology, and will earn my Ph.D in psychology in the spring of 2018. The information I will present to you on lifestyle changes is based on an integration of research conducted by experts in this area. During my research and clinical experiences I have also gained expertise about the impact of lifestyle changes on mental health. Additionally, in my role working with clients as a psychologist-in-training, I have seen how engaging in certain lifestyle changes has helped my clients improve their mental health.
- The purpose of my presentation is to inform you of some potential benefits of engaging in certain lifestyle changes. The lifestyle changes that I will present are both preventative and therapeutic tools that can be used to foster positive mental health, enhance physical health, and improve academic performance. I have every confidence that you can successfully incorporate these lifestyle changes and obtain beneficial results.
- Lifestyle changes are simple changes people can make in their approach to daily life that can improve mental health; such as increasing quality of life, life satisfaction, happiness, and well-being.
- I will cover 8 lifestyle changes, including: spending time with nature, getting adequate sleep, engaging in sufficient physical activity, maintaining proper diet and nutrition, engaging in social interactions, being of service to others, utilizing stress management and relaxation techniques, and involvement with religion and spirituality
- You have two main goals during this presentation. 1) Please watch and listen carefully; and, 2) Learn about some valuable information that you will be capable of using in the future to improve your mental health.

Number 1) Time with Nature

- Generations of humans have spent significant time outdoors in nature. People work and play in nature, and are largely dependent upon it for survival. Today, though, as a whole, we are spending less and less time outdoors. This is leading many people to experience what has been termed "nature-deficit disorder," which is a lack of connection and interaction with the natural environment.
- Nature provides greenery, natural light, and many fascinating and beautiful stimuli (trees, flowers, lakes, rivers, and mountains), that many of us are no longer experiencing on a

regular basis. Not only is this preventing us from enjoying the natural beauty on this earth, but it is negatively impacting our mental health.

- Spending time with nature has many benefits for our mental health (in addition of course to benefits for physical health and academic performance), including:
    - The reduction of mental fatigue, enhancement of well-being, and assisting in recovery from stress and trauma
    - Increases in positive emotions and reduced negative emotions (such as decreased anger and aggression)
    - An increased sense of vitality (having physical and mental energy) and a sense of flourishing.
    - The possible alleviation of symptoms of depression, anxiety, ADHD, and migraines. In addition, spending time with nature can be a beneficial additive to medication you may be taking or therapy you may be engaging in for mental health difficulties.
- There are many different ways that you can interact with nature, such as: sitting in nature; working in nature (e.g., gardening, landscaping); playing in nature (e.g., swimming, playing croquet, having a barbeque), viewing nature through a window; and, viewing pictures of nature. Just pick one you enjoy and you will be able to start making this change and experiencing the benefits!
- After I discuss each lifestyle change, I will provide you with some testimonials about the positive impact that people just like you have experienced when engaging in the lifestyle changes. These testimonials are from students at Iowa State.

Number 2) Sleep

- Sleep is extremely important, which is why we should spend approximately 1/3 of our lives sleeping. Why is sleep so important? Because it allows for the restoration of physical and mental functioning, physical growth, storage and deeper processing of information learned throughout the day, and physical and mental healing.
- According to the National Sleep Foundation, young adults, like you, require 7-9 hours of sleep per night for optimal functioning and restorative benefits - anything less than that is insufficient. Unfortunately, studies indicate that many college students only receive about 6.5 hours of sleep per night due to the many demands on their time and the freedom and independence that college brings.
- Lack of adequate sleep is associated with many things that can negatively impact our mental health. For instance, insufficient sleep may possibly, in addition to other life events, increase the likelihood of experiencing:
    - Poorer well-being, decreased life satisfaction, reduced quality of life
    - Interpersonal difficulties (for example more frequent conflict with friends)
    - Depression, anxiety, mood instability, negative moods, substance use, and stress
    - Getting sufficient sleep on the other hand, can allow for greater well-being, life satisfaction, and quality of life.
- Do you ever notice how you often feel better in the morning than you did the night before? Or how people often say that “all I need is a good night’s sleep?” Well, maybe now you have a better understanding of why. Even though it may be challenging to set aside time to get enough sleep, I have confidence that you can do so and the mental and physical rewards will be worth it!

- Testimonial

Number 3) Physical Activity

- Often, when we think of engaging in physical activity or exercise we imagine spending time in a gym or engaging in very specific activities designed to tone muscles, burn fat, or lose weight.
- However, physical activity is not solely defined as running, lifting weights, or using other gym equipment. Additional frequently used types of physical activity include: racquetball, tennis, bowling, basketball, jogging, softball, biking, swimming, aerobics, sports, and walking. Anything that gets the body moving and expending energy is considered to be physical activity.
- Physical activity provides benefits to mental health through boosting endorphins – the natural "feel good" drug.
- No need to over-do it…in fact, don't! Exercising beyond routine levels for your physical fitness can negatively impact your mood instead of helping it.
- In addition to the number of physical health benefits that come from engaging in regular physical activity, there are many mental health benefits, including:
    - Increased well-being, enhanced vitality, improved quality of life, and more positive emotions
    - Improved body image and improved self-esteem
    - Possible reductions in stress, depression, and anxiety, as well as an increased ability to cope with stress. Engaging in physical activity can be a beneficial additive to medication you may be taking or therapy in which you may be engaging.
- There are many great ways to engage in physical activity, you may even discover that you have a talent for something you try; and, no matter how good you are at any given activity, you can still enjoy the benefits! You will feel better mentally and physically, be better able to concentrate during your classes, and possibly even feel better about your appearance. You can do it!
- Testimonial

Number 4) Diet and Nutrition

- Have you ever heard the idiom "we are what we eat"? In some ways, this idiom is quite true, as what we eat influences our mood, emotion, cognitive ability, academic achievement, and appearance.
- In discussing diet and nutrition as a lifestyle factor, researchers are not focusing on eliminating certain foods or counting calories. Rather, the focus is on having a good balance in diet, incorporating certain important food groups and nutrients, and eating everything in moderation.
- These important food groups and nutrients include: fruits, vegetables, and omega-3 fatty acids (such as can be found in fish oil supplements).
- Additionally, limiting certain foods and beverages can be just as important to our mental health. Specifically, limiting the extent to which you consume fast food, snacks, soft drinks, energy drinks, and alcohol is important.
- The food we ingest impacts how our brain and gut functions and reacts, which then influences how we feel on the whole.

- The benefits that you may notice if you make changes to your diet and nutritional intake, include:
    - More positive overall mental health
    - Enhanced well-being, better quality of life, greater life satisfaction, and increased happiness
    - Possible reductions in anxiety, depression, and stress symptoms. Maintaining proper diet and nutrition can be a beneficial additive to medication you may be taking or therapy in which you may be engaging.
- The college lifestyle may not always feel particularly conducive to eating healthy, but you do have options and I have confidence that you can take advantage of those options!
- Testimonial

Number 5) Social Interaction

- Humans are social beings, we need each other in many different ways, including for our mental health.
- Social interaction is defined as: the frequency and quality of time spent in the company of others (e.g., family, friends, peers, acquaintances)
- Social support is defined as: the "various forms of aid and assistance supplied by family members, friends, neighbors, and others"
- Social interaction and social support bolster mental health by providing individuals with people with whom to share concerns, accompany them through life's difficulties, and keep loneliness at bay
- Social interaction and social support also impact us physiologically, for instance, through the hormone oxytocin. Among other things, oxytocin increases our desire to connect and interact with others, and can lead to reductions in anxiety as well as an increase in feelings of calmness and feelings of contentment.
- The specific benefits of spending time with others and receiving social support include:
    - An increased sense of well-being, enhanced life satisfaction, and greater confidence
    - More positive emotions (such as increased happiness) and fewer negative emotions (social support can actually help prevent sadness)
    - Fewer depression-like symptoms, reduced stress, and some protection from the development of other mental health problems
- Not only is spending time with others enjoyable, it is also crucial to our mental health. So find time to hang out with friends and family, like I know you can!
- Testimonial

Number 6) Being of Service to Others and Altruistic Behavior

- Being of service to others and engaging in altruistic behavior is the sixth lifestyle change upon which we will focus.
- Being of service to others refers to helping others in some way (e.g., volunteering for a public service, working on a help hotline). Similarly, altruism is the principle or practice of unselfish concern for, or devotion to, the welfare of others. Altruistic behavior can include family helping behaviors, having a helping orientation (propensity to help others), active and engaged listening, and lending emotional support.

- Helping others provides the helper with positive mental health benefits because it allows individuals to focus outward instead of inward on stress that may be occurring in their lives. It provides individuals with a break from their own concerns and self-focus. This disengagement from self-focus provides an opportunity to adapt new, healthier, worldviews and perspectives. Additionally, volunteering is a great activity to add to your resume and may help with future graduate school or career aspirations.
- When people serve others in some manner, they experience a "helper's high," similar to how runners feel a "runner's high." This high gives the individual experiencing it immediate gratification for the activity in which they engaged.
- The benefits of engaging in service to others or altruistic behavior include:
    - Increased self-esteem, increased sense of purpose, and personal growth
    - More positive emotions such as happiness, love, joy, peace, and calmness
    - Greater well-being, self-acceptance, and an enhanced quality of life
    - Reductions in anxiety
    - Add encouraging language here - per your committee, about looking and feeling better, doing better in school, etc.
- You have the capability to help others and make a difference in this world, and the world will be better for having you serve it!
- Testimonial

Number 7) Stress Management and Relaxation

- Our lives are full of stress, and most people need to actively find ways to reduce and manage that stress in order to maintain good mental health, physical health, and optimal academic performance.
- Stress management and relaxation are processes of managing and coping with the stress and distress that people experience on a regular basis.
- There are many, many ways to engage in stress management and relaxation. Examples include: tai chi, progressive muscle relaxation, meditation, art, music, and yoga.
- Benefits to your mental health include:
    - Enhanced life satisfaction, self-acceptance, and quality of life
    - Increased positive affect and decreased negative affect
    - Improved mood states
    - Decreases in stress and anxiety
    - Add encouraging language here - per your committee, about looking and feeling better, doing better in school, etc.
- Most stress management and relaxation techniques are easy, and often fun. Prioritize these activities in your life, you deserve it!
- Testimonial

Number 8) Religion and Spirituality

- Defining religion and spirituality can be tricky. One specific definition offered by researchers, though, is that religion and spirituality reflect a level of commitment to that which is sacred to the individual. This definition includes aspects such as: motivation to engage in religion and spirituality practices, feeling a purpose in life, coping, behavior, and beliefs.

- The specific religious affiliation you may or may not hold is not what is important. Rather, identifying as religious and/or spiritual in some manner or form, or engaging in spiritual practices can bring benefits.
- These benefits include:
    - Enhanced well-being, increased quality of life, and greater life satisfaction
    - The presence of role models and a sense of purpose
    - More positive emotion (e.g., happiness), less negative emotion, greater optimism, and more positive worldviews
    - Empowerment, hope, self-esteem, and self-acceptance
    - Reduced risk of experiencing stress or developing mental health problems (such as anxiety, depression).
- Even if you are not certain how you identify religiously or spiritually, this can be a great time in your life to explore, I know you can!
- Testimonial

You have now learned about 8 different lifestyle changes that you can incorporate into your life. Adopting these changes may take some practice and planning to be able to utilize them on a regular basis, but stick with it and you will successfully be able to do so, just as many other people like you have! You got this! Thank you for listening!

Item 1: Please briefly reflect on and write about past successful experiences you have had engaging in each of the lifestyle changes you just learned about.

Nature:
Sleep:
Physical Activity:
Diet and Nutrition:
Social Interaction:
Service to Others:
Stress Management and Relaxation:
Religion and Spirituality:

Item 2:
Take a few moments to imagine that you have reached a place in your life where you become regularly able to engage in the eight lifestyle changes you have just learned about. Reflect on what it would feel like and mean to you to accomplish such a thing. Consider the positive feelings about yourself that you would experience by enhancing your mental health; by pushing through the initial challenge of building new habits to regularly practice these eight lifestyle changes; to have more energy; and, to have a greater capacity to effectively cope with school, work, and life demands. Also, if you have had an experience in which you have already been able to successfully incorporate all or some of these eight lifestyle changes into your life, reflect on how you felt about yourself by being able to do so. Please write below about what you have reflected on.

APPENDIX D. MENTAL HEALTH LOCUS OF CONTROL

Instructions: Using the scale provided, please rate the extent to which you **agree** with each statement.

1	2	3	4	5	6
Disagree	Slightly Agree	Somewhat Agree	Moderately Agree	Largely Agree	Fully Agree

If I develop a mental health problem, it is my own behavior that determines how soon I get well.

No matter what I do, if I am going to develop a mental health concern, it will happen.

Having regular contact with my physician and/or mental health counselor is the best way for me to avoid mental health problems.

Most things that affect my mental health happen to me by accident.

Whenever I am not mentally healthy, I should consult a trained professional.

I am in control of my mental health.

My family has a lot to do with my mental health.

When my mental health is not good, I am to blame.

Luck plays a big part in determining how soon I recover from a mental health difficulty.

Health professionals and mental health counselors control my mental health.

My good mental health is largely a matter of good fortune.

The main thing that affects my mental health is what I do for myself.

If I take care of myself, I can avoid mental health problems.

Whenever I recover from a mental health problem, it's usually because other people (for example, doctors, nurses, mental health counselors, family, and friends) have been taking good care of me.

No matter what I do, I'm likely to develop a mental health difficulty.

If it's meant to be, I will stay mentally healthy.

If I take the right actions I can stay mentally healthy.

Regarding my mental health, I can only do what my doctor or mental health counselor tells me to do.

APPENDIX E. OUTCOME EXPECTATIONS ASSESSMENT

Post-Intervention Instructions: Using the scale provided, please rate the ***degree of likelihood*** that your mental health will actually improve if you undertake each of the following activities.

1	2	3	4	5	6
Not at all likely	Slightly likely	Somewhat likely	Moderately likely	Largely likely	Totally likely

Spend at least 2 hours per week learning about international news issues.

Watch the nightly news or read a daily newspaper at least 2 hours per week.

Spend at least 30 minutes every day being outdoors.

Spend at least 30 minutes every day viewing nature through a window or pictures of nature.

Sleep 7-9 hours each night as a routine sleep schedule.

Maintain good sleep hygiene nightly (e.g., no screen time 30 minutes prior to bed).

Engage in moderate physical activity for at least 2.5 hours per week.

Exercise in some way and broke a sweat for at least 2.5 hours per week.

Play on a club or intramural sports team at least once a week.

Attend a club meeting or activity at least once a week.

Maintain a well-balanced diet, eating everything in moderation on a daily basis.

Eat in a healthy way, every day, without consuming too much of any one kind of food.

Spend at least 30 minutes per day talking with others.

Spend at least 30 minutes per day interacting with others.

Spend time volunteering to be of help to others at least once a week.

Spend time dedicated to serving others, in some way, at least once a week.

Spend time cleaning your living space for at least 1 hour per week.

Spend time putting away and organizing your belongings for at least 1 hour per week.

Utilize deep breathing, yoga, or meditation techniques for 2-4 hours per week.

Engage in peaceful, quiet, or relaxing activities for 2-4 hours per week.

Reflect on the personal meaning of your religion or spirituality at least once a week.

Seek out some information about your religion or spirituality at least once a week.

Cook meals for yourself at least three times a week.

Fix your own lunch to take to school or work at least three times a week.

Read for pleasure (non-school material) at least 2 hours per week.

Surf the web (for non-school related activities) at least 2 hours per week.

Enjoy engaging in a personal hobby at least 2 hours per week.

Attend or participated in a fun activity for at least 2 hours per week.

Try to interact face-to-face with a new friend or acquaintance once a week.

Try to talk with someone you didn't know at least once a week.

Spend at least two hours per week learning a new skill.

Spend at least two hours per week picking up a new hobby or organized activity.

APPENDIX F. PREFERENCES ASSESSMENT

Instructions: Please rank ***each*** of the following items, from most preferred [1] to least preferred [32], in terms of which you would **most prefer** to actually increase beyond your current level of use.

Spend at least 2 hours per week learning about international news issues.

Watch the nightly news or read a daily newspaper at least 2 hours per week.

Spend at least 30 minutes every day being outdoors.

Spend at least 30 minutes every day viewing nature through a window or pictures of nature.

Sleep 7-9 hours each night as a routine sleep schedule.

Maintain good sleep hygiene nightly (e.g., no screen time 30 minutes prior to bed).

Engage in moderate physical activity for at least 2.5 hours per week.

Exercise in some way and broke a sweat for at least 2.5 hours per week.

Play on a club or intramural sports team at least once a week.

Attend a club meeting or activity at least once a week.

Maintain a well-balanced diet, eating everything in moderation on a daily basis.

Eat in a healthy way, every day, without consuming too much of any one kind of food.

Spend at least 30 minutes per day talking with others.

Spend at least 30 minutes per day interacting with others.

Spend time volunteering to be of help to others at least once a week.

Spend time dedicated to serving others, in some way at least once a week.

Spend time cleaning your living space for at least 1 hour per week.

Spend time putting away and organizing your belongings for at least 1 hour per week.

Utilize deep breathing, yoga, or meditation techniques for 2-4 hours per week.

Engage in peaceful, quiet, or relaxing activities for 2-4 hours per week.

Reflect on the personal meaning of your religion or spirituality at least once a week.

Seek out some information about your religion or spirituality at least once a week.

Cook meals for yourself at least three times a week.

Fix your own lunch to take to school or work at least three times a week.

Read for pleasure (non-school material) at least 2 hours per week.

Surf the web (for non-school related activities) at least 2 hours per week.

Enjoy engaging in a personal hobby at least 2 hours per week.

Attend or participated in a fun activity for at least 2 hours per week.

Try to interact face-to-face with a new friend or acquaintance once a week.

Try to talk with someone you didn't know at least once a week.

Spend at least two hours per week learning a new skill.

Spend at least two hours per week picking up a new hobby or organized activity.

APPENDIX G. DEMOGRAPHICS

Instructions: Please answer the following demographic and history questions.

A. What is your ISU NetID? (For example, if your ISU email address is 'jsmith@iastate.edu' then your ISU NetID is 'jsmith'). _____

1) Sex M____ F____ Other____

2) Age ____

3) Year in School Freshman____ Sophomore____ Junior____

Senior____ Other____

4) Race/Ethnicity (mark all that apply)

____ American Indian or Alaskan Native ____ Asian American

____ African or African American (Black) ____ Hawaiian or Other Pacific Islander

____ Hispanic/Latino American ____ European American (White)

____ Middle Eastern American ____ International

5) With whom do you live?

Alone Roommate(s) Partner Children Parents/Guardians

Social Relations

6) During the past month, how many people do you consider being in your circle of friends?

0-5 6-10 11-15 16-20 20+

7) During the past month, how often did you see, spend time, or communicate with your friends?

1	2	3	4	5
Never	Rarely	Some	Quite Often	Very Often

8) During the past month, how often did you see, spend time, or communicate with your family?

1	2	3	4	5
Never	Rarely	Some	Quite Often	Very Often

APPENDIX H. PILOT STUDY QUESTION

Instructions: Using the scale provided, please rate the extent to which the presentation you watched ***increased your confidence to successfully engage in the following behaviors***: spend time with nature, get adequate sleep, engage in sufficient physical activity (exercise), maintain proper diet and nutrition, engage in social interactions, be of service to others, utilize stress management and relaxation techniques, and be involved with religion or spirituality.

1	2	3	4	5	6	7
Not at all	Very little	Slightly	Somewhat	Moderately	Quite a bit	Completely

APPENDIX I. ONE WEEK FOLLOW-UP TLC USE

Instructions: Using the scale provided, please indicate the extent to which, **during this past week,** you have **actually increased your use** of each of the following activities.

1	2	3	3	4	5
Not at all	Very little	Slightly	Somewhat	A moderate amount	A great amount

Spent at least 2 hours per week learning about international news issues.

Watched the nightly news or read a daily newspaper at least 2 hours per week.

Spent at least 30 minutes every day being outdoors.

Spent at least 30 minutes every day viewing nature through a window or pictures of nature.

Slept 7-9 hours each night as a routine sleep schedule.

Maintained good sleep hygiene nightly (e.g., no screen time 30 minutes prior to bed).

Engaged in moderate physical activity for at least 2.5 hours per week.

Exercised in some way and broke a sweat for at least 2.5 hours per week.

Played on a club or intramural sports team at least once a week.

Attended a club meeting or activity at least once a week.

Maintained a well-balanced diet, eating everything in moderation on a daily basis.

Ate in a healthy way, every day, without consuming too much of any one kind of food.

Spent at least 30 minutes per day talking with others.

Spent at least 30 minutes per day interacting with others.

Spent time volunteering to be of help to others at least once a week.

Spent time dedicated to serving others, in some way at least once a week.

Spent time cleaning your living space for at least 1 hour per week.

Spent time putting away and organizing your belongings for at least 1 hour per week.

Utilized deep breathing, yoga, or meditation techniques for 2-4 hours per week.

Engaged in peaceful, quiet, or relaxing activities for 2-4 hours per week.

Reflected on the personal meaning of your religion or spirituality at least once a week.

Sought out some information about your religion or spirituality at least once a week.

Cooked meals for yourself at least three times a week.

Fixed your own lunch to take to school or work at least three times a week.

Read for pleasure (non-school material) at least 2 hours per week.

Surfed the web (for non-school related activities) at least 2 hours per week.

Enjoyed engaging in a personal hobby at least 2 hours per week.

Attended or participated in a fun activity for at least 2 hours per week.

Tried to interact face-to-face with a new friend or acquaintance once a week.

Tried to talk with someone you didn't know at least once a week.

Spent at least two hours per week learning a new skill.

Spent at least two hours per week picking up a new hobby or organized activity.

APPENDIX J. PILOT STUDY INFORMED CONSENT

Title of Study: Lifestyle Changes
Investigators: Kaitlyn Florer, MS; Loreto Prieto, PhD

This is a research study. Please take your time in deciding if you would like to participate.

Introduction
The purpose of this pilot study is to assess participant impressions of two presentations.

Description of Procedures
Participants voluntarily sign up to participate in this study via the SONA website. If you decide to participate in this study you will be granted access to a link to an online survey via the SONA website. Your responses to the survey will be confidential, no identifying information will be linked to your data, and all data will be reported in aggregate form.

You will view an intervention sharing information about certain lifestyle changes. After participating in this intervention, you will be asked to complete a question regarding the presentation you viewed.

Risks
We do not anticipate that this study will cause participants any discomfort whatsoever. If you feel any discomfort at any point during this study, you may immediately end your participation.

Benefits
There will be no direct benefits to you; however, through this study we hope to learn information that could help improve college student mental health. You have other methods of obtaining the required course research credit. Consult your course syllabi for this information.

Costs and Compensation
You will be awarded one SONA research credit for your participation in this study. The estimated amount of time required to complete this study is 15 - 30 minutes. Please be aware that you will not be able to save your responses and return to the survey at another time. Therefore, be sure to complete ***all*** research materials in one sitting.

Participant Rights
Your participation in this study is completely voluntary. If you would like to refuse to participate or end your participation, you may do so, at any time, without any penalty or negative consequences. In order to receive your credit, you must make a good faith effort to complete all research materials. However, you have the right to not answer any questions on the survey that you do not wish to answer (simply skip the questions by using the forward arrow buttons at the bottom of each page).

Confidentiality
Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government

regulatory agencies, auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, we will take the following measures: 1) no joining or connection of your consent form will be made to the record of data you enter online; 2) no physical consent forms will be generated to prevent any joining or connection with any research data (electronic or hard copy) you enter to protect the identities of all participants; 3) any physical materials generated (e.g., copies of raw research data) will be stored in a locked file cabinet in a locked lab; and, all electronic raw data will be kept in password protected files or computers. If the results are published, your identity will remain confidential and all data will be described in aggregate (group) form.

Questions or Problems
You are encouraged to ask questions at any time during this study.

- For further information about the study contact Kaitlyn Florer at kflorer@iastate.edu (515.294.1742) or Dr. Loreto Prieto at lprieto@iastate.edu (515.294.2455).
- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

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PARTICIPANT SIGNATURE
By checking the "Yes, I agree to participate" box, I am confirming that I have read the informed consent form and that I am at least 18 years of age. I voluntarily agree to participate in this study, the study has been explained to me, and I have been given the time to read the informed consent document and understand it. By checking the "No, I do not agree to participate" box, you will end your participation in this study.

Yes, I agree to participate.
No, I do not agree to participate.

APPENDIX K. MAIN STUDY INFORMED CONSENT

Title of Study: Lifestyle Changes
Investigators: Kaitlyn Florer, MS; Loreto Prieto, PhD

This is a research study. Please take your time in deciding if you would like to participate.

Introduction
The purpose of this study is to better understand the lifestyle of college students and their openness to enacting beneficial changes in their lives.

Description of Procedures
Participants voluntarily sign up to participate in this study via the SONA website. If you decide to participate in this study you will be granted access to a link to an online survey via the SONA website. Your responses to the survey will be confidential, no identifying information will be linked to your data, and all data will be reported in aggregate form.

You will participate in an intervention sharing information about certain lifestyle changes. After participating in this intervention, you will be asked to complete a series of items related to the lifestyle changes about which you will be learning. After one week of completing the main portion of this study, you will receive a follow-up e-mail from the researcher asking you to answer a few additional questions.

Risks
We do not anticipate that this study will cause participants any discomfort whatsoever. If you feel any discomfort at any point during this study, you may immediately end your participation.

Benefits
There will be no direct benefits to you; however, through this study we hope to learn information that could help improve college student mental health. You have other methods of obtaining the required course research credit. Consult your course syllabi for this information.

Costs and Compensation
You will be awarded three SONA research credit for your participation in this study and one *additional* research credit if you participate in the follow-up. The estimated amount of time required to complete the initial survey is 61-90 minutes; the follow up survey will take approximately 15-30 minutes. Please be aware that you will not be able to save your responses and return to the surveys at another time. Therefore, be sure to complete ***all*** research materials in one sitting for both this and the follow up survey.

Participant Rights
Your participation in this study is completely voluntary. If you would like to refuse to participate or end your participation, you may do so, at any time, without any penalty or negative consequences. In order to receive your credit, you must make a good faith effort to complete all research materials. However, you have the right to not answer any questions on the survey that

you do not wish to answer (simply skip the questions by using the forward arrow buttons at the bottom of each page).

Confidentiality
Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, we will take the following measures: 1) no joining or connection of your consent form will be made to the record of data you enter online; 2) no physical consent forms will be generated to prevent any joining or connection with any research data (electronic or hard copy) you enter to protect the identities of all participants; 3) any physical materials generated (e.g., copies of raw research data) will be stored in a locked file cabinet in a locked lab; and, all electronic raw data will be kept in password protected files or computers. If the results are published, your identity will remain confidential and all data will be described in aggregate (group) form.

Questions or Problems
You are encouraged to ask questions at any time during this study.

- For further information about the study contact Kaitlyn Florer at kflorer@iastate.edu (515.294.1742) or Dr. Loreto Prieto at lprieto@iastate.edu (515.294.2455).
- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office for Responsible Research, Iowa State University, Ames, Iowa 50011.

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PARTICIPANT SIGNATURE
By checking the "Yes, I agree to participate" box, I am confirming that I have read the informed consent form and that I am at least 18 years of age. I voluntarily agree to participate in this study, the study has been explained to me, and I have been given the time to read the informed consent document and understand it. By checking the "No, I do not agree to participate" box, you will end your participation in this study.

Yes, I agree to participate.
No, I do not agree to participate.

FOLLOW-UP STUDY
All participants in this research will receive a very brief (15 minutes) follow-up survey in one week. At that time, we will e-mail you and invite you to participate in a brief follow-up survey for **one additional research credit**. Upon reception of this follow up email, you have the choice to volunteer to complete the brief survey; you are not required to do so. All established and previously described informed consent and human subjects rights for the initial study apply to your choice to complete the follow up survey. Once all data is collected for the follow up survey,

all ISU NetIDs provided during the initial study will immediately be removed from all research materials and destroyed. Absolutely no records of ISU NetIDs will be retained.

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
2420 Lincoln Way, Suite 202
Ames, Iowa 50014
515 294 4566

Date: 10/31/2016

To: Kaitlyn J Flores
W112 Lagomarcino Hall

CC: Dr. Loreto Prieto
W218 Lagomarcino Hall

From: Office for Responsible Research

Title: Lifestyle Changes

IRB ID: 16-466

Approval Date:	10/28/2016	**Date for Continuing Review:**	10/27/2016
Submission Type:	New	**Review Type:**	Expedited

The project referenced above has received approval from the Institutional Review Board (IRB) at Iowa State University according to the dates shown above. Please refer to the IRB ID number shown above in all correspondence regarding this study.

To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- **Use only the approved study materials** in your research, **including the recruitment materials and informed consent documents that have the IRB approval stamp**.
- **Retain signed informed consent documents for 3 years after the close of the study**, when documented consent is required.
- **Obtain IRB approval prior to implementing any changes** to the study by submitting a Modification Form for Non-Exempt Research or Amendment for Personnel Changes form, as necessary.
- **Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences** involving risks to subjects or others; and (2) any **other unanticipated problems involving risks** to subjects or others.
- **Stop all research activity if IRB approval lapses**, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.
- **Complete a new continuing review form** at least three to four weeks prior to the date for continuing review as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Please be aware that IRB approval means that you have met the requirements of federal regulations and ISU policies governing human subjects research. **Approval from other entities may also be needed.** For example, access to data from private records (e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **IRB approval in no way implies or guarantees that permission from those other entities will be granted.**

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 202 Kingland, to officially close the project.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.